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FlightFit

An Application Enabling Air Travelers
to Do Stretches Onboard

By **Ninglin Jiang**

A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of Master of Fine Arts
in Visual Communication Design

School of Design
College of Art and Design
Rochester Institute of Technology
Rochester, NY

December, 2018

Thesis Approvals

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Abstract

Currently, with the development of economy and the improvement of people's living standards, more people would prefer traveling by air. However, sitting for extended periods of time on a long flight would be an uncomfortable joyless experience and it may have negative implications for health. A study from the World Health Organisation confirmed that the risk of developing venous thromboembolism (VTE) approximately doubles after travel lasting four hours or more. So carrying out some stretches frequently as well as standing up and moving around as often as possible under permitted conditions would help to improve blood circulation and relieve muscle soreness.

Designing a system which helps air travelers reduce stiffness and fatigue by doing inflight stretches effectively and conveniently is the ultimate goal of this thesis project. FlightFit is an iOS application which introduces basic stretching techniques to air travelers in an interactive way. Users can not only stretch different muscle groups by following the default sessions visually and acoustically, but can also customize their own stretching plans based on different needs through the application. The thesis project utilizes UI Design, UX Design and Motion Graphics Design methodologies, which aims at providing air travelers an accessible and effective solution to help them improve flexibility and keep body active during long flights. The whole process can be divided into four stages in this project: Research, Design, Evaluation and Implementation. Each stage involves relevant design methodologies, tools and outcomes that take part in the process to make this project highly efficient and usable. The final deliverables of this project are an interactive prototype and a motion prototype for iPhone and iPad.

Keywords

UI design, UX design, motion graphics design, interaction design, prototype, inflight stretching, flight, air traveler, airplane, application, iPhone, iPad, iOS

1

Introduction

1.1 Situation Analysis

Airplane rides can be a bit tight and uncomfortable at times, especially if air travelers are not in first class or business class. In aviation, according to the time airborne during a flight, flight length can be divided into four categories: short-haul (Under 3 hours), medium-haul (3 to 6 hours), long-haul (6 to 12 hours) and ultra long-haul (Over 12 hours).¹ Cramped airplane seats and a considerable lack of movement throughout the flight for four hours or more can be contributing factors to blood clotting. Sitting upright and inactive for four hours or more may be a risk of blood clots. The study from the World Health Organisation suggests that exercising the calf muscles and ankles with up and down movements can encourage blood flow and may help to reduce blood stagnation.²

The reality is that air travelers are not only facing difficulties in obtaining feasible and effective resources about inflight stretches, but also having restrictions in carrying out stretches during flight. On one hand, there are just a few airlines have provided stretching techniques in their inflight facilities. Along with lack of relevant resources, when muscles become tense and stiff, most of air travelers would normally do in-seat stretches by themselves or walk around the cabin. Admittedly, it does help people reduce soreness and stay limber, but unprofessional stretches may lead to physical injuries. Also, if there are many people walking around at the same time,

1 "Flight Length." Wikipedia. November 25, 2016. Accessed October 10, 2018. https://ipfs.io/ipfs/QmXoypijzjW3WknFIJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Flight_length.html.

2 "7 Simple Exercises For Long-Haul Flights." Jayride.com. August 01, 2018. Accessed October 10, 2018. <https://jpress.jayride.com/blog/travel-tips/7-simple-exercises-for-long-haul-flights/>.

it may cause inflight disturbance, especially to other passengers. On the other hand, some air travelers would prefer to pay a little and get access to the inflight Wi-Fi service to find more professional help about stretching techniques. However, most inflight stretching infographics they can find are just static illustrations with step-by-step texts which are hard to reflect the movements intuitively, not to mention some impractical videos that showing stretches can only be performed in the aisle. So it's meaningful that there is a feasible, effective and intuitive application which can provide professional and doable inflight stretches and ultimately, help them unwind and stay limber and loose during long flight.

1.2 Problem Statement

FlightFit is an iOS application designed specifically for air travelers who are taking four-hour (or more) flights often. Air travelers can access the application by connecting inflight Wi-Fi service with iPhone or iPad in the air. The goal of this thesis project is to design an interactive infographic system using UI and UX design methodologies to create an application which provides eight doable and effective inflight stretching techniques in an interactive and intuitive format. FlightFit includes easy-to-follow stretching illustrations, step-by-step audio instructions, customizable stretching plans, notification reminders, and inflight tips, which aims at helping air travelers improve blood circulation and keep body active during long flights.

This thesis project focuses on two main design fields: UX Design and UI Design. Employing UX design methodologies to understand project's goals and users needs, then applying this understanding into UI design process would make the application useful, usable and delightful.

The thesis project aims to answer the following challenging questions:

- How to visualize the inflight stretching techniques in an intuitive way?
- How to accomplish simplification in the user interface?
- How to use UI motion/animation to improve the interactions?
- How to create an inflight user experience that users would feel calm and refreshed in the air?
- How to encourage users to do stretches regularly during the flight?

2

Literature Review

2.1 Inflight Stretch

Book

The Airplane Workout: Don't Just Sit There!

Gold, Diane. The Airplane Workout: Don't Just Sit There! Kindle Edition. Kung Fu Conservatory, July 23, 2014.

The Airplane Workout is simple, detailed, has photos to give air travelers an easier way to learn and can be adjusted for all fitness levels. The exercises included in this book are based upon ancient kung fu, which is the perfect set of exercises for airplane trip.

Travel Doesn't Have to Make You Sick: Staying Healthy in Airports, Airplanes, and Anywhere On the Road

Brady, Ken. Travel Doesn't Have to Make You Sick: Staying Healthy in Airports, Airplanes, and Anywhere On the Road. Kindle Edition. SpeakerNet News, June 3, 2011.

The eBook includes full of ideas on how air travelers can stay healthy while on the airplane.

Easy Airplane Yoga

Lincoln, Jerri. Easy Airplane Yoga. Paperback. Ralston Store Publishing, October 31, 2011.

Using words and pictures, the book demonstrates how to do easy yoga poses that anyone can accomplish without the necessity of special yoga apparel. Air travelers can enjoy the benefit of soft stretches and relaxing movements right at their seats.

Website

Your wellbeing onboard | Virgin Atlantic

"Your wellbeing onboard." <https://www.virginatlantic.com/us/en/travel-information/your-wellbeing-onboard.html>

Virgin Atlantic provides air travelers simple tips to make them feel comfortable and relaxed during the flight.

How to Do an In Flight Fitness Workout

WikiHow. "How to Do an In Flight Fitness Workout." July 28, 2018.
<https://www.wikihow.com/Do-an-In-Flight-Fitness-Workout>.

The easy-to-follow routine outlined in this article will help air travelers keep body supple and refreshed during a long haul flight.

Inflight workout | Qantas US

"Inflight workout." <https://www.qantas.com/us/en/travel-info/travel-advice/your-health-inflight.html>

The exercises are designed to provide a safe way to stretch and move certain muscle groups that can become stiff during long periods of sitting.

Video

Exercises to Do on the Airplane

Potts, Rolf. USA Today. <https://traveltips.usatoday.com/exercises-airplane-10614.html>

Air travelers can learn how to exercise the ankles, legs, neck and shoulders with help from a travel author in this video on exercises to do on an airplane.

Sit and Be Fit - Airplane Workout to Prevent DVT

Wilson, Mary Ann. YouTube. April 29, 2011. <https://www.youtube.com/watch?v=-tL4D5tlzljc>.

The stretches from the video is designed with a team of medical and health professionals, it is ideal for older adults and others who need slow gentle movement during a long flight.

Travel tips: the amazing 7-exercise travel workout that you can do from your airplane seat!

Fitness Reloaded. October 10, 2011. <https://www.youtube.com/watch?v=eCxDeIdIWpU>.

In this video, the performer shows seven exercises to help air travelers avoid super-stiff during a long flight.

2.2 Interaction Design

Book

The Fundamentals of Interactive Design

Salmond, Michael, and Gavin Ambrose. The fundamentals of Interactive Design. London: AVA Academia, April 1, 2013.

The book takes people step by step through each stage of the creative process – from inspiration to practical application of designing interfaces and interactive experiences. The book will help readers design media that engages, entertains, communicates and 'sticks' with the audience. Packed with examples of groundbreaking interactive design, this book provides a solid introduction to the principles of interactive communication and detailed case studies from world-leading industry experts.

The Principles and Processes of Interactive Design

Steane, Jamie. The Principles and Processes of Interactive Design. Fairchild Books, March 27, 2014.

The Principles & Processes of Interactive Design aims at new designers from across the design and media disciplines who want to learn the fundamentals of designing for interactive media. This book is intended both as a primer and companion guide on how to research, plan and design for increasingly prevalent interactive projects.

Book

About Face: The Essentials of Interaction Design

Cooper, Alan, Robert Reimann, David Cronin, and Christopher Noessel.

About Face: The Essentials of Interaction Design. 4th Edition. Indianapolis: Wiley, September 2, 2014.

About Face: The Essentials of Interaction Design is the latest update to the book that shaped and evolved the landscape of interaction design. This comprehensive guide takes the worldwide shift to smartphones and tablets into account. New information includes discussions on mobile apps, touch interfaces, screen size considerations, and more. The new full-color interior and unique layout better illustrate modern design concepts.

Designing for Interaction: Creating Innovative Applications and Devices

Saffer, Dan. Designing for Interaction: Creating Innovative Applications and Devices. 2nd Edition. Berkeley, CA: New Riders, August 24, 2009.

The thought-provoking new edition of Designing for Interaction offers the perspective of one of the most respected experts in the interaction design field. This book will help readers how to create a design strategy and how to use design research to uncover user's behaviors. It also offers interviews and case studies from industry leaders on prototyping, designing in an Agile environment, service design, ubicomp, robots, and more.

2.3 UI Motion

Book

Designing Interface Animation: Meaningful Motion for User Experience

Head, Val. Designing Interface Animation: Meaningful Motion for User Experience. Paperback. 1st Edition. Brooklyn, NY: Rosenfeld Media, July 26, 2016.

The book shows readers how to create web animation that balances purpose and style while blending seamlessly into the user's experience. This book is a crash course in motion design theory and practice for web designers, UX professionals, and front-end developers alike.

From Idea to App: Creating iOS UI, animations, and gestures (Voices That Matter)

Welch, Shawn. From Idea to App: Creating IOS UI, Animations, and Gestures (Voices That Matter). 1st Edition. New Riders, March 17, 2011.

The book would help designers and developers to create basic user interface elements, understand navigation metaphors and practices, design for multiple devices, customize system UI elements, use touch and motion-based gestures and create UI animations to enhance the interaction.

Book

**Perpetual Motion Genius' Guide to Interface Design:
Interface Design Secrets**

Coppedge, Nathan. Perpetual Motion Genius' Guide to Interface Design: Interface Design Secrets. Paperback. 1st Edition. CreateSpace Independent Publishing Platform, September 22, 2014.

It is an excellent quality guide of prophetic proportions, providing five-dimensional standards for interface design and also offers long-term extrospection on the real nature of interface.

Design for Motion: Fundamentals and Techniques of Motion Design

Shaw, Austin. Design for Motion: Fundamentals and Techniques of Motion Design. 1st Edition. New York, NY: Routledge, December 10, 2015.

The book plumbs the depths of core motion design fundamentals and harness the essential techniques of this diverse and innovative medium, combining basic art and design principles with creative storytelling to create compelling style frames, design boards, and motion design projects.

3

Research

3.1 Research on Seat Size

When evaluating the size of a seat on airplane, the main terms used are pitch and width. Seat pitch refers to the space between a point on one seat and the same point on the seat in front of it. Seat width is the distance from armrest to armrest.³

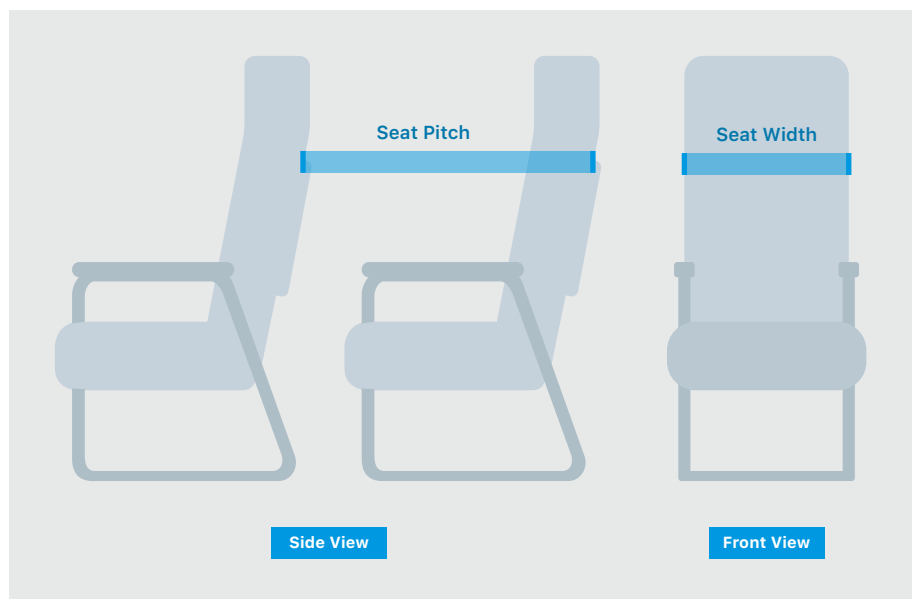


Figure 1.
Illustrations of seat pitch
and seat width

This research focuses on the seat pitch and seat width of economy class from the major airlines in United States⁴, the research covered twelve airline carriers during this study.

³ "Airline Seat." Wikipedia. August 09, 2018. Accessed October 10, 2018. https://en.wikipedia.org/wiki/Airline_seat.

⁴ "Major Airlines of the United States." Wikipedia. August 31, 2018. Accessed October 10, 2018. https://en.wikipedia.org/wiki/Major_airlines_of_the_United_States.

Figure 2.

Comparison chart of the seat pitch and seat width between different airlines

Airline	Seat Pitch	Seat Width
Alaska Airlines	31-32 in.	17 in.
Allegiant Air	30 in.	17-17.5 in.
American Airlines	30-32 in.	17.2-18.5 in.
Delta Air Lines	30-33 in.	17.2-18.25 in.
Frontier Airlines	30-31 in.	17-18 in.
Hawaiian Airlines	30-32 in.	17-18 in.
JetBlue	30-34 in.	17-18.25 in.
Southwest Airlines	31-33 in.	17 in.
Spirit Airlines	28 in.	17.75-20 in.
Sun Country	31-33 in.	17 in.
United Airlines	30-36 in.	17-20.5 in.
Virgin America	32 in.	17.7 in.

(Source: "Airplane Headrests - The Solution to Shrinking Airline Seats." Kaz Headrest. Accessed October 10, 2018. <https://kazheadrest.com/airplane-headrests-solution-shrinking-airline-seats/>.)

Based on the research, it presents seat pitch and width can vary greatly among airlines, even among aircraft types for the same airline. In order to ensure that air travelers can perform these inflight stretches the most flexibly, this thesis project needs to consider the minimum dimension of the seat pitch (28 in.) and seat width (17 in.).

3.2 Research on Muscle Groups

“When you’re crammed into a tiny airplane seat, your body has a hard time pumping blood from your legs back to your heart to keep it circulating”, says Aaron Aday, M.D., a cardiology fellow at Brigham and Women’s Hospital in Boston.⁵ Sitting for long periods in an airplane can limit blood circulation and cause a condition called deep vein thrombosis (DVT). In DVT, blood clots form in the deep veins of the lower legs and thighs. Prolonged immobility, especially when seated, has major physical effects on human body as a whole, but also on certain muscle groups in particular. Contraction of muscles is an important factor in helping to keep blood flowing through the veins. When sitting for long periods of time, the iliopsoas muscles those that connect from thigh bone to spine are in a constant flexed position. In this position, the muscles are shorter, which can pull on spine more when standing, contributing to back pain and difficulty straightening leg muscles. Additionally, the added pressure to the muscles on the back of thighs, known as the hamstrings, can affect blood circulation and lead to muscle breakdown.⁶ Therefore, it’s important to keep muscles strength and flexibility when sitting during long flights.

The study shows human body's muscles can be divided into six major

5 Shortsleeve, Cassie. "This Is How Often You Should Stand Up on a Flight." Condé Nast Traveler. October 05, 2016. Accessed October 10, 2018. <https://www.cntraveler.com/stories/2016-04-14/why-and-how-often-you-should-get-up-during-a-flight>.

6 Nall, Rachel. "Weak Leg Muscles From Sitting at a Desk Too Long." LIVESTRONG.COM. November 22, 2017. Accessed October 10, 2018. <https://www.livestrong.com/article/552814-weak-leg-muscles-from-sitting-at-a-desk-too-long>.

groups: chest, back, arms, shoulders, legs and calves.⁷ This thesis project is aiming to provide air travelers with a full-body inflight stretching plan to help them minimize the risk of blood clotting and mitigate against achy muscles and stiff joints during long flights. After gathering information from multiple medical stretching articles, the thesis project would concentrate on eight stretching techniques which covers the major muscle groups for full body.

Stretch	Benefited Muscle Groups	Instructions	Sketch
Neck	Chest, Arms, Shoulders, Neck	Tilt your head toward the shoulder. Place your hand on your head and gently pull until you feel the stretch in your neck. Hold for 15 seconds and relax, then repeat on the other side.	
Shoulders	Arms, Shoulders	Slowly roll your shoulders forward for 15 seconds in a circular motion and relax. Next, repeat this movement for 15 seconds backwards.	
Arms	Chest, Back, Arms, Shoulders	Interlace your fingers and raise your arms up alongside your ears, keeping the elbows straight. Slowly lean to the left side, hold for 15 seconds and relax, then repeat on the other side.	

Figure 3.1.

Details of the eight stretches in FlightFit

⁷ Legge, Armistead. "The Best Way to Train All 6 Major Muscle Groups." Muscle For Life. November 06, 2017. Accessed October 10, 2018. <https://www.muscleforlife.com/muscle-groups>.

3 Research / 3.2 Research on Muscle Groups


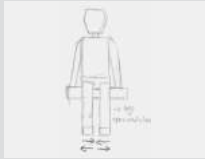



Stretch	Benefited Muscle Groups	Instructions	Sketch
Back	Back, Arms, Shoulders, Neck	Place your hands on your lower back and gently push your hands forward while leaning back slightly. Hold for 15 seconds and release back to a normal posture. Repeat this movement three times.	
Legs	Legs, Calves	Sit upright and keep a certain distance between your feet. Open and close your legs in a fluid motion. Repeat this movement for 30 seconds.	
Knees	Back, Arms, Legs, Calves	Straighten one leg forward, with heel on the ground and toes pointed up. Keep the other foot flat on the floor. Keep back straight, gently lean forward, hold 15 seconds and release. Repeat on the other side.	
Calves	Arms, Shoulders, Calves	Bend forwards slightly and lift one knee towards your chest, using one hand as support. Massage your leg from ankles to knees. Repeat this movement for 15 seconds, then switch to the other leg.	
Feet	Legs, Calves, Feet	Keep your heels on the floor and point your toes up as far as you can. Then keep your toes on the floor and raise your heels, and release. Repeat this movement for 30 seconds.	

Figure 3.2.

Details of the eight stretches in FlightFit

3.3 Research on Inflight Service

Since the thesis project seeks to provide an accessible and convenient solution for air travelers to obtain the “inflight stretching system”, it is necessary to research the inflight facilities in depth. This research focuses on two main components of economy class, seat-back TV screen and inflight Wi-Fi service, which are accessible and affordable for every passenger on the airplane. The research covered twelve airline carriers during this study.

Airline	Seat-back TV Screen	Inflight Wi-Fi
Alaska Airlines	No	75% Have
Allegiant Air	No	100% Have
American Airlines	70% Have	80% Have
Delta Air Lines	No	98% Have
Frontier Airlines	No	No
Hawaiian Airlines	No	No
JetBlue	No	100% Have
Southwest Airlines	No	90% Have
Spirit Airlines	No	No
Sun Country	No	No
United Airlines	75% Have	85% Have
Virgin America	No	100% Have

Figure 4.
Comparison chart of the seat-back TV screen and inflight Wi-Fi between different airlines

(Source: Dilley, John. "The 7 Best US Airlines for In-Flight Wi-Fi in 2018." HighSpeedInternet.com. March 14, 2018. Accessed October 10, 2018. <https://www.highspeedinternet.com/resources/best-in-flight-wifi>.)

Based on the research, it shows that most of airlines don't have seat-back TV screens, but most of them offer inflight Wi-Fi service. Even though some aircrafts don't offer inflight Wi-Fi service, the passengers can also download the application before they fly. Therefore, this thesis project would design an iOS application that air travelers can download from the apple store to use it with their own devices by connecting to Internet or Wi-Fi service.

3.4 Competitive Analysis

Competitor A

Prolonged leg immobility may cause difficulty in blood circulation and subsequently cause blood clots to form in the deep veins within the legs. The research result indicated that only Qantas and British Airways offer relevant inflight exercise program in their aircrafts. Both of them include a professional inflight exercise video in their seat-back TV screens to help air travelers raise awareness of blood clots. But these exercise videos also have some downsides.

Qantas Airways and British Airways

Links

<https://www.youtube.com/watch?v=Gv7enzl7Yq8>

<https://www.britishairways.com/en-us/information/health-and-wellbeing>

Strengths

- It's very persuasive for air travelers because the seated inflight exercises has been performed by real models.
- Air travelers can watch the exercise videos whenever they want from the seat-back TV screens.
- The exercise video has closed captions and audio instructions contained.

Weaknesses

- There is no function that air travelers can watch different parts of stretches separately, they need to move the progress button to a specific timestamp.
- There are not much interactions between air travelers and the video.
- Air travelers can't create their own stretching plans based on their needs.
- There are no notifications showing on the TV screen to remind air travelers to do stretches regularly during the flight.

Competitor B

Currently, there are many inflight stretching websites existing on the internet. Most of them are showing step-by-step static images or illustrations with detailed instructions, so air travelers can follow the stretches separately. But they also have some disadvantages at the same time.

Infographic illustrations

Links

<https://p-airnz.com/cms/assets/NZ/PDFs/inflight-comfort.pdf>

<https://www.united.com/web/en-US/content/travel/inflight/health.aspx>

Strengths

- It has detailed instructions and guided arrows which would help air travelers understand the stretches more clearly.
- Air travelers can easily find the specific stretching technique from the infographic illustrations.
- Air travelers can print it out in advance and take it with them onboard.

Weaknesses

- There are no interactions between the infographic and users.
- Don't have any notification system which can reminder air travelers to do stretches regularly.
- There is no built-in timer which can help air travelers keep tracking when performing stretches.
- Paper copies are hard to take and easily get lost on road.

3.5 Risk Factors of Blood Clots

When performing inflight stretches through the application, air travelers should be in good health and free from high blood pressure, heart, back or neck problems, and motion sickness. Air travelers should also understand there are many factors outside of long air travel can increase the risk for blood clots. So for safety reasons, if passengers have one or more following factors⁸, they need to do stretches frequently during the flight:

- Personal or family history of blood clots
- Older age (risk increases after age 40)
- Habit of smoking
- Obesity (body mass index [BMI] greater than 30kg/m²)
- Hormone replacement therapy
- Recent surgical procedure within the past three months
- Vein damage due to injury
- Current or recent pregnancy
- Active cancer or recent cancer treatment
- Catheter placed in a large vein

⁸ "Blood Clots and Travel: What You Need to Know | CDC." Centers for Disease Control and Prevention. February 2, 2018. Accessed October 10, 2018. <https://www.cdc.gov/ncbddd/dvt/travel.html#ref>.

Except performing inflight seated-stretches to reduce the risk of blood clots, there are some other things air travelers can do⁹, such as:

- Avoid crossing legs which can reduce blood circulation.
- Wear loose and non-constricting clothing.
- Wear compression stockings to stimulate circulation and prevent blood from pooling.
- Limit alcohol and caffeine, which may contribute to dehydration.
- Bring personal water bottle and request water service to stay hydrated.

9 "Health and Wellbeing Tips | Flying Health | British Airways." Book Flights, Holidays & Check In Online | British Airways. Accessed October 10, 2018. <https://www.britishairways.com/en-us/information/health-and-wellbeing#intheair>.

3.6 / 3 Research

Research on Users

3.6.1 Identify Target Audience

When starting to design this project, the target audience was defined first by thinking about who FlightFit should be designed for. Then list out all of the questions to evaluate the target audience better:

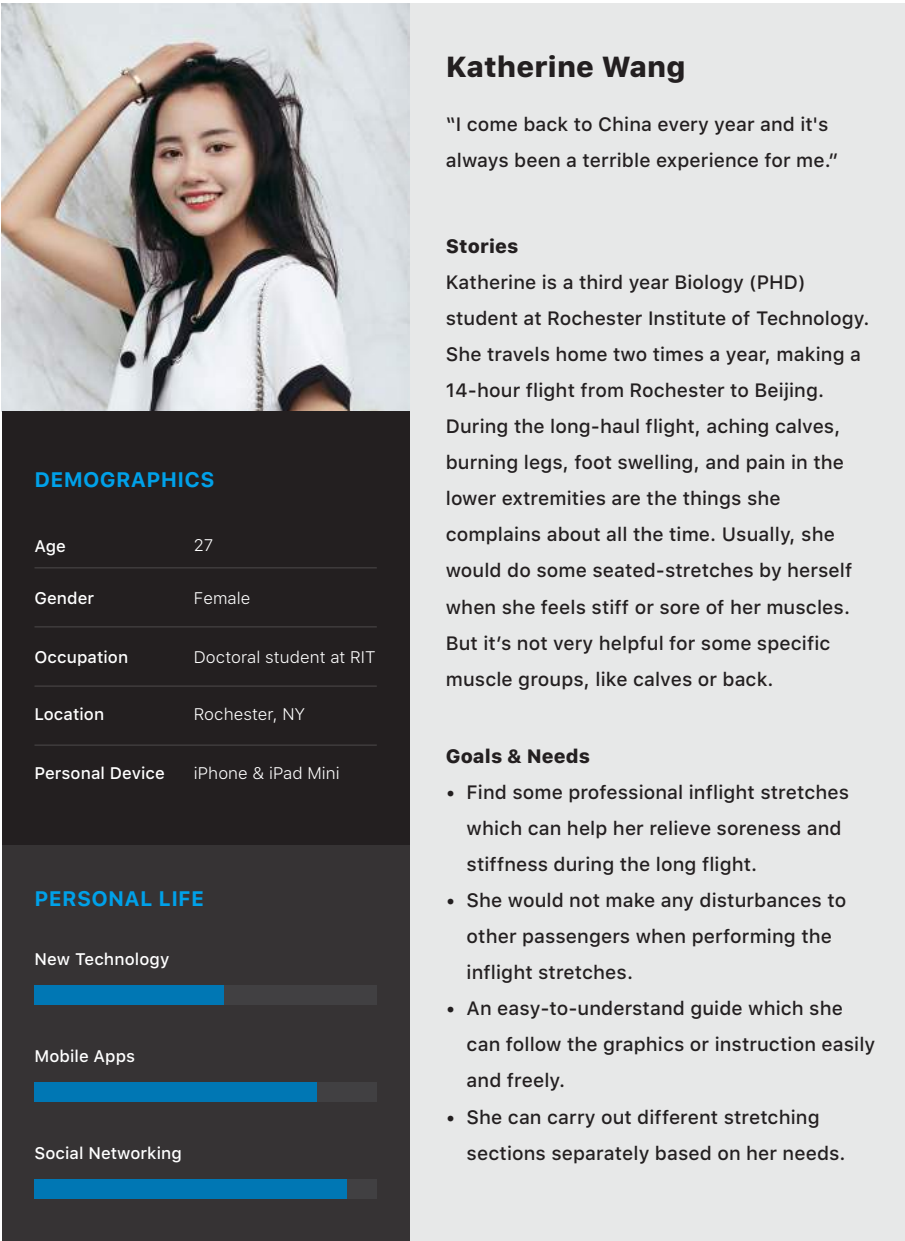
- What does a typical FlightFit user look like?
- What are the users' reasons for using FlightFit?
- What would keep the users come back?

FlightFit is designed for helping air travelers minimize the risk of blood clotting and mitigate against achy muscles and stiff joints by doing inflight stretches regularly during long flights. So the primary target audience of this thesis project are air travelers between the ages of 18 and 60, who are taking long flights (four hours or more¹⁰) in economy class. However, the air travelers whose age, flight length and travel class are out of above range may also be included in the target audience, if they feel stiff, sore or pain in the air. Moreover, the target users should have their personal iOS devices (iPhone or iPad) to access the application.

¹⁰ "Study Results Released on Travel and Blood Clots." World Health Organization. December 08, 2010. Accessed October 10, 2018. <https://www.who.int/mediacentre/news/releases/2007/pr-35/en/>.

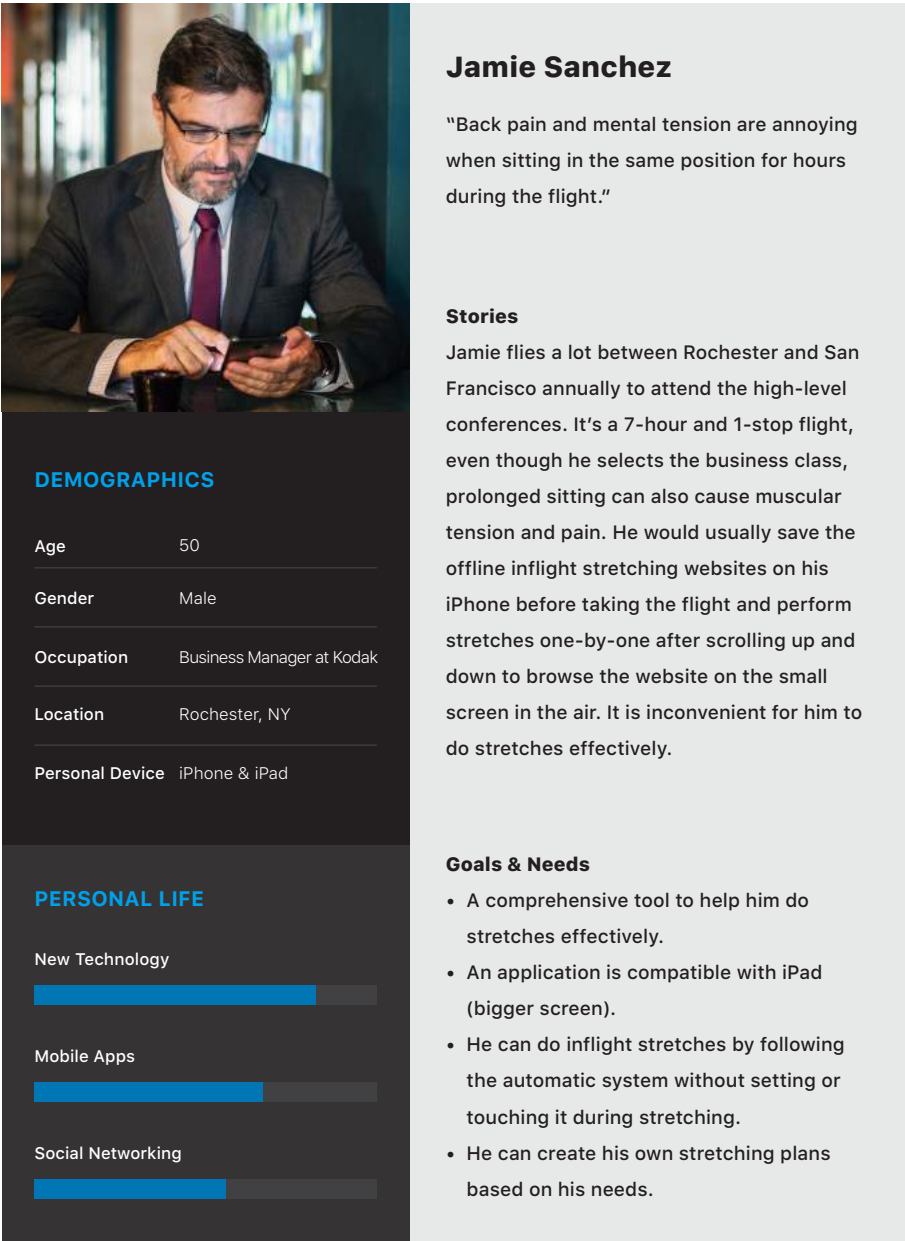
3.6.2 User Persona

Figure 5.1.
User Persona A:
Katherine Wang



(Persona image from Unsplash: <https://unsplash.com/photos/ultSAUQa120>)

Figure 5.2.
User Persona B:
Jamie Sanchez



(Persona image from Unsplash: <https://unsplash.com/photos/2JyPTrDOMOA>)

3.6.3 User Journey Map

Mapping out users' experiences allows the designer to understand the users' unique motivations. There are some questions designers should ask themselves from the user's perspective:

- Why do the users download and open the application?
- How easy is the application to understand and use immediately?
- How well does the users' experience extend across multiple stages when using the application?

In order to gain deeper insights into how users experience the application, this user journey map was divided into three stages, Before Flying, While Flying and After Flying.

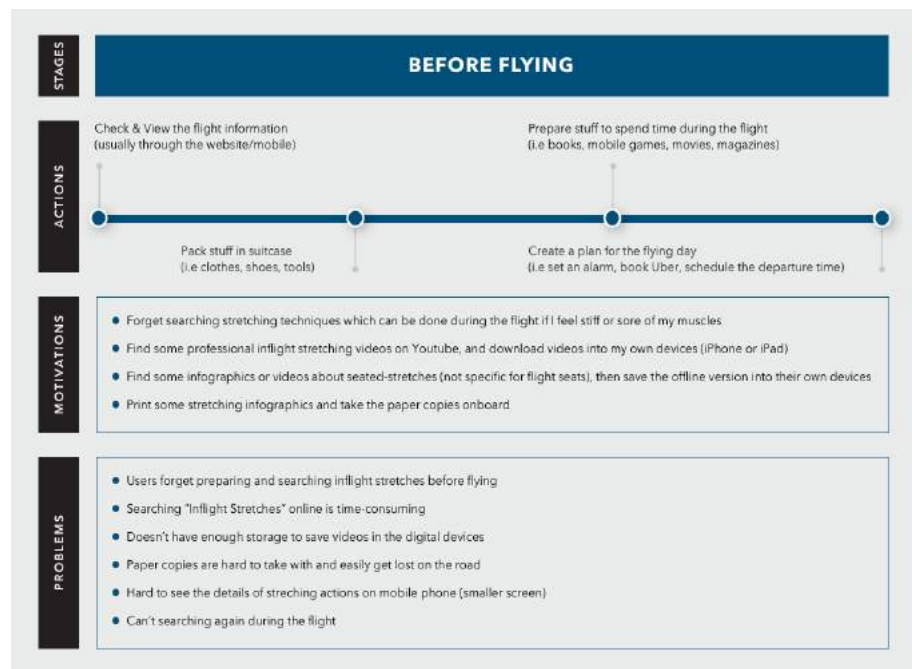


Figure 6.1.
User Journey Map A:
Before Flying

Figure 6.2.
User Journey Map B:
While Flying

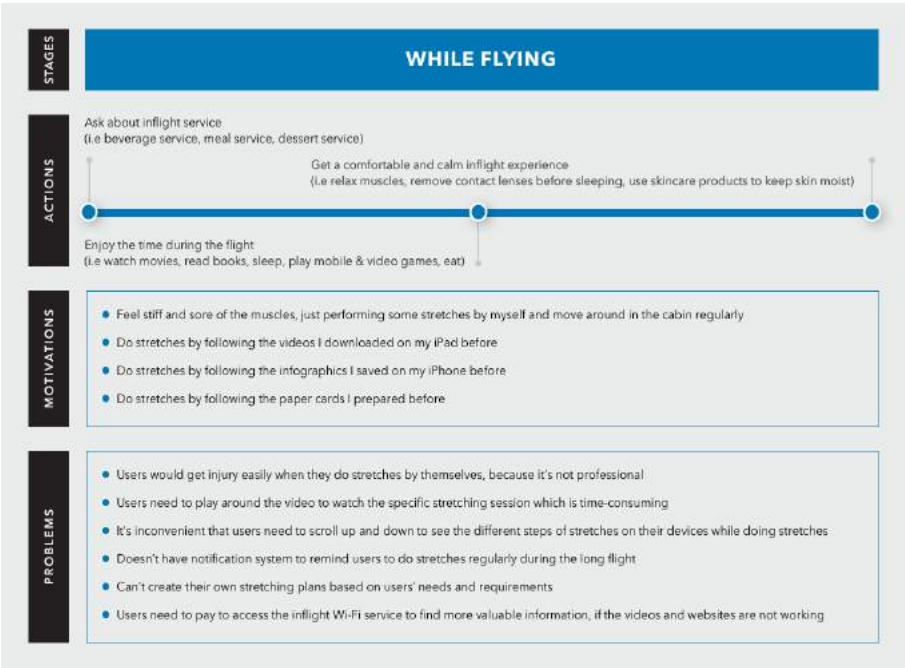
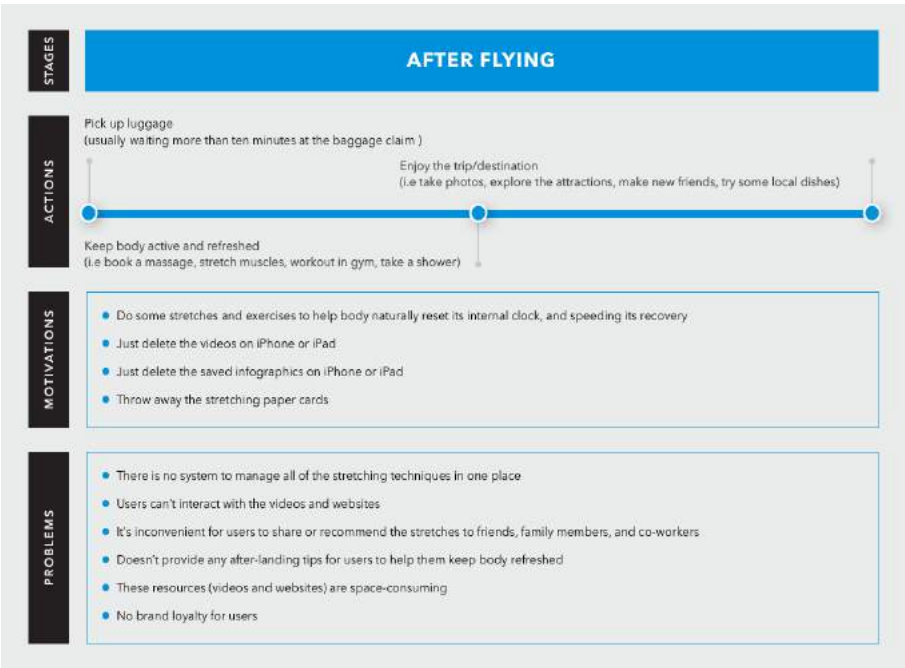


Figure 6.3.
User Journey Map C:
After Flying



4

Design Process

4.1 Design Concept

FlightFit is an interactive application about inflight stretches. It is designed for iOS system that users can use the application on their iPhone or iPad.

FlightFit is trying to create a digital and infographic system to meet the demands of air travelers by providing eight professional and doable seated inflight stretching techniques to help air travelers raise awareness of blood clots and stay loose during long flights.

Goals and Objectives

The ultimate goals and objectives of this thesis project are based on research and user interviews, as follows:

- Use UX methodologies to smooth the design process from beginning to the end and improve UI designs at each stage.
- Define target audience and collect data from them by user interviews.
- Help users to understand the risks of prolonged immobility and encourage them to do the inflight stretches regularly during long flights.
- Research and classify the stretching techniques based on the eight main muscle groups.
- Design an interactive and intuitive system that users can get the information more easily and quickly.
- Create a calm and refreshed user experience for the target audience.

- Provide dynamic illustrations, detailed descriptions, audio instructions and built-in timer for each stretches.
- Provide a customized system that users have the ability to create their own stretching plans based on their preferences.
- Gather users' feedbacks through the usability testing session.

4.2 Design Methodology

The final outcome of the thesis project are an interactive prototype for iPhone and iPad, and a series of motion prototype which would help viewers understand the interactions and transitions of the application. Adobe Illustrator was used to develop all of the characters and illustrations, while Sketch was used primarily to craft UI designs of the application. The interactive prototype and the motion prototype were all created in Principle.

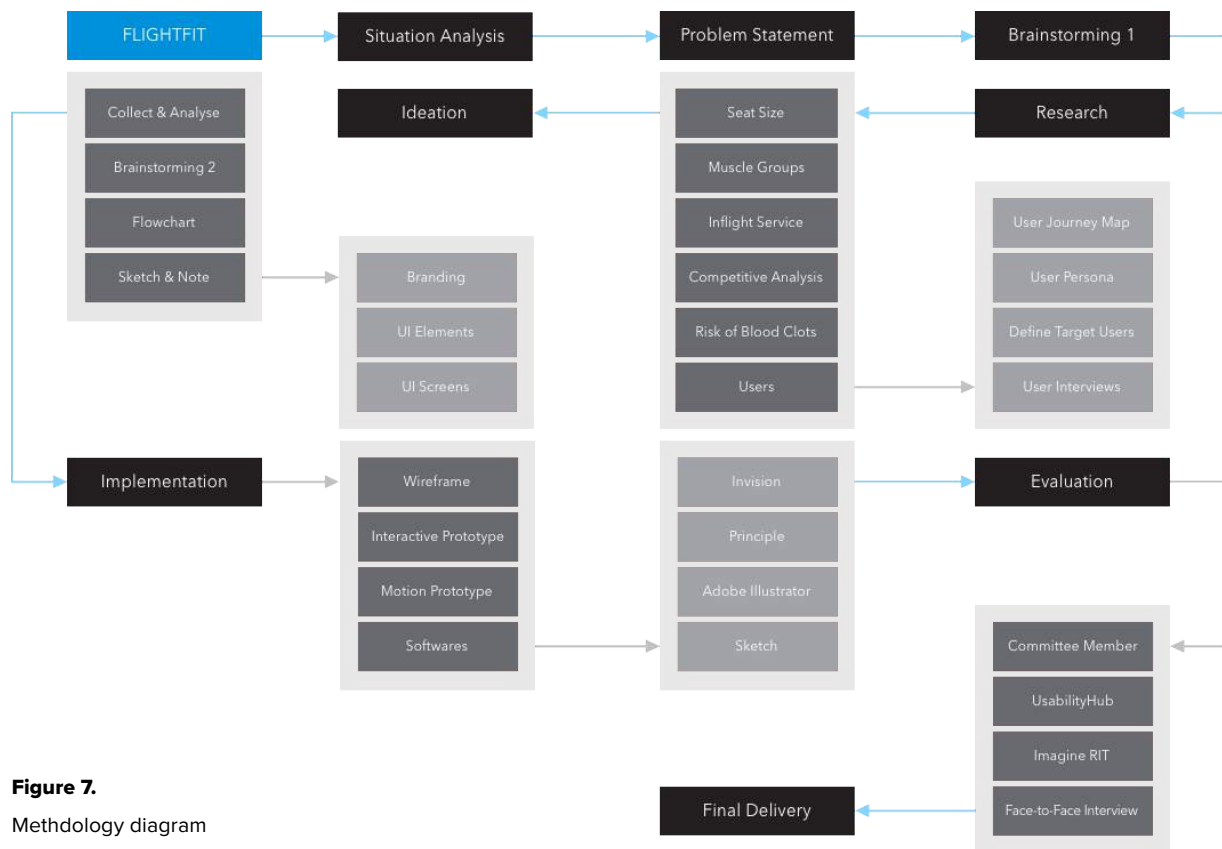


Figure 7.
Methodology diagram

4.3 Mind Mapping

The mind map was created to brainstorm thoughts and visually structure ideas around the central concept (FlightFit).

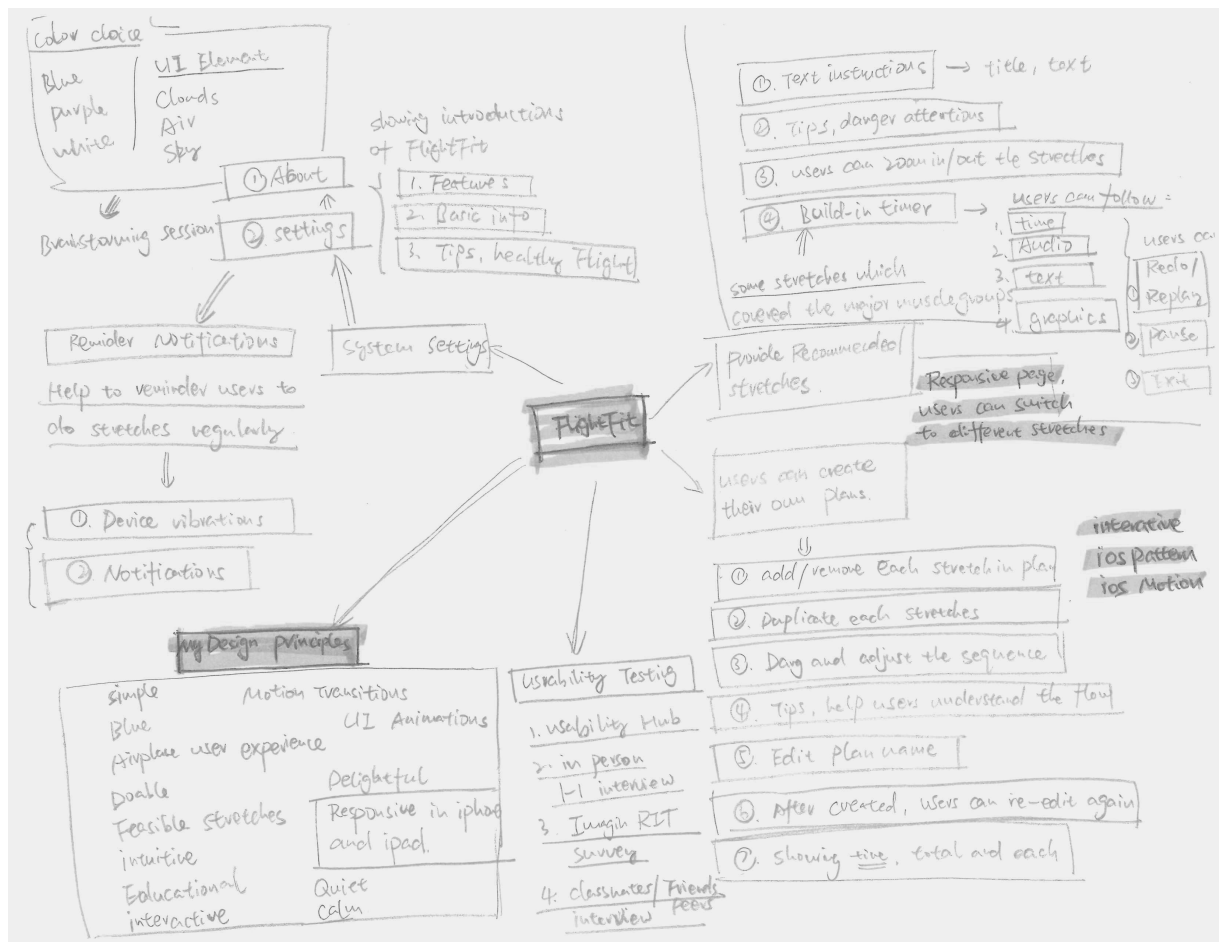


Figure 8.
Mind map

4.4 Information Architecture

Information Architecture (IA) is a blueprint of the design structure which can be generated into wireframes of the thesis project. A good information architecture is a foundation of efficient user experience which makes the application easy to use. This IA aims at organizing content so that users would quickly and easily navigate through the application and find everything they need without big effort.

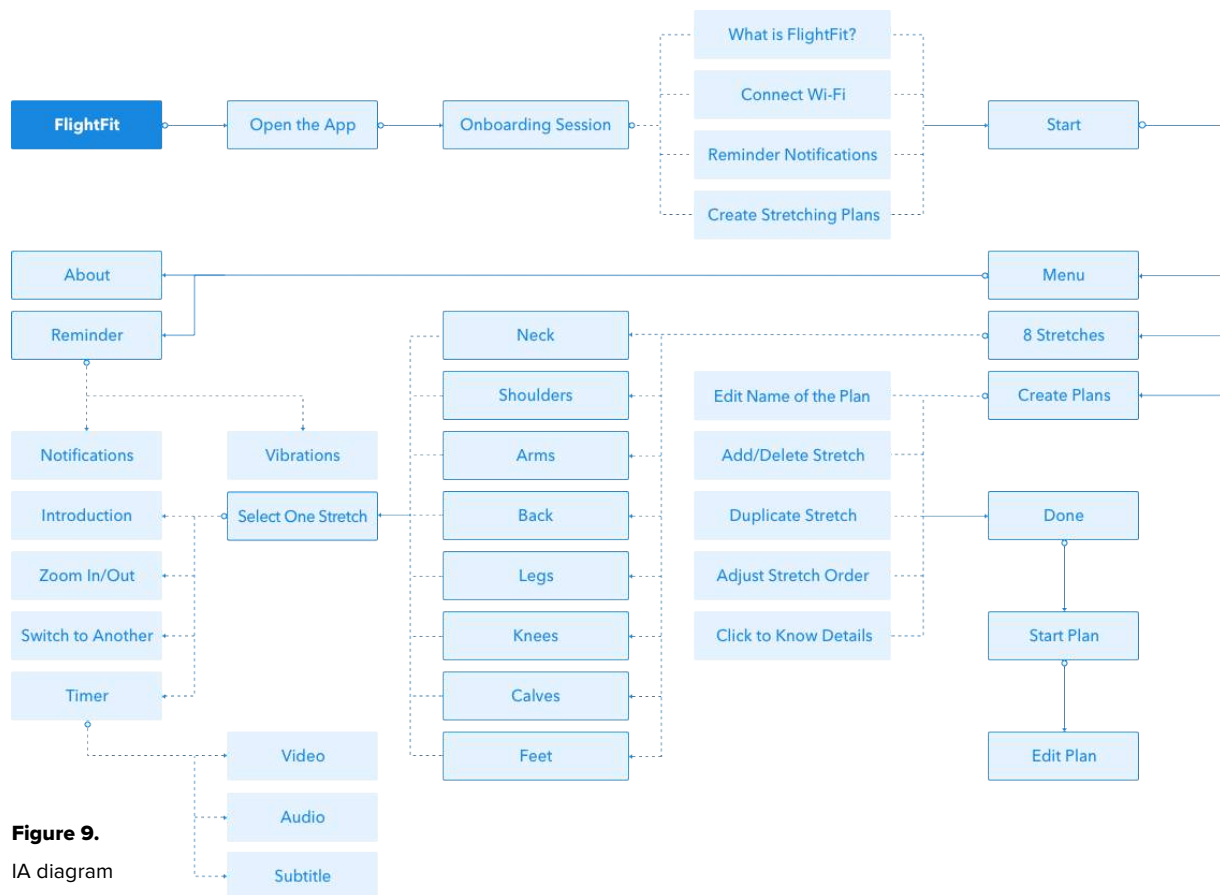


Figure 9.
IA diagram

4.5 / 4 Design Process

Style Sheet

4.5.1 Keyword Brainstorming

Brand is an image created with a set of distinguishing features and promoting awareness, and recognizability of the product. So, application branding is how users will perceive the app interacting with it. In order to create a brand for this thesis project, the designer needs to answer the following questions first:

- Who is going to use the application and why are they going to use it?
- What makes the application unique compared to others?
- What is the look of the application?
- What is the main message the application transfers?
- What feelings and emotions does the application give its users?

After answering those questions above, a list was made with project-related keywords to brainstorm different combinations of the thesis project. After a long period of exploration, the application was named “FlightFit”, which is the combination of two keywords: Flight and Fit.

Flight	Health	Air Traveler	Stretch
Airplane	Wellbeing	Passager	Exercise
Aircraft	Active	Blue	Workout
Air	Refresh	Travel	Fit
Cloud	Comfortable	Trip	Fitness
Plane	Calm	Journey	Movement
Cabin	Active	Departure	Motion
Aisle	Unwind	Destination	Tip

4.5.2 Logo Design

Logo is the basic mark of brand identity, it's the most prominent symbol of brand image and the foundation of interaction enabling its connection with the target audience. This thesis project is called "FlightFit", so the design concept of logo started from the two first letters "F". Firstly, the logo didn't use any typefaces, the designer used multiple squares to create the letter "F", which gives the letter a sense of balance and design. Then, transformed the two letters into a square and rotate it by 45 degrees to make the logo more dynamic and helps to connect a feeling of fitness. In order to increase a sense of flexibility and familiarity, the square was also designed with round corners. Moreover, the complementary combination of blue and white contributes to the perceived overlapping of the foreground and the background, which also adding a subtle layering effect to the whole logo and helping users build a connection with the theme of flight.

Sketches

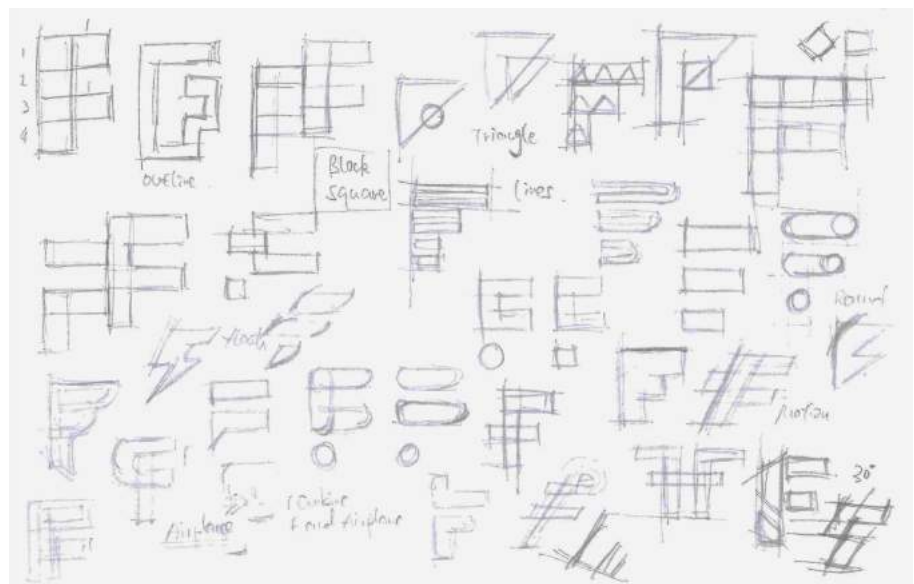


Figure 10.
Logo sketches

Final Logo Design



Figure 11.
From left to right:
Grids, B&W version,
Colored version

App Icon Example

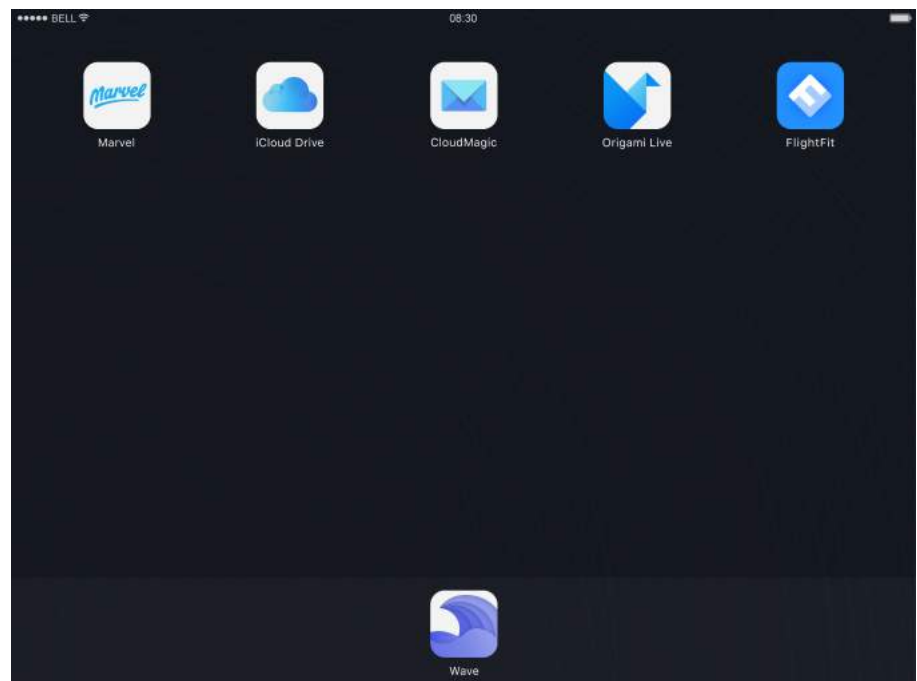


Figure 12.
App icon on iPad

Logo Animation

An animated logo is a modern and dynamic way to present a brand. It helps to increase memorability, brand awareness, improve storytelling, and create an original image for a brand. There are four UX motion techniques used in this logo animation, easing, parenting, transformation, and parallax.

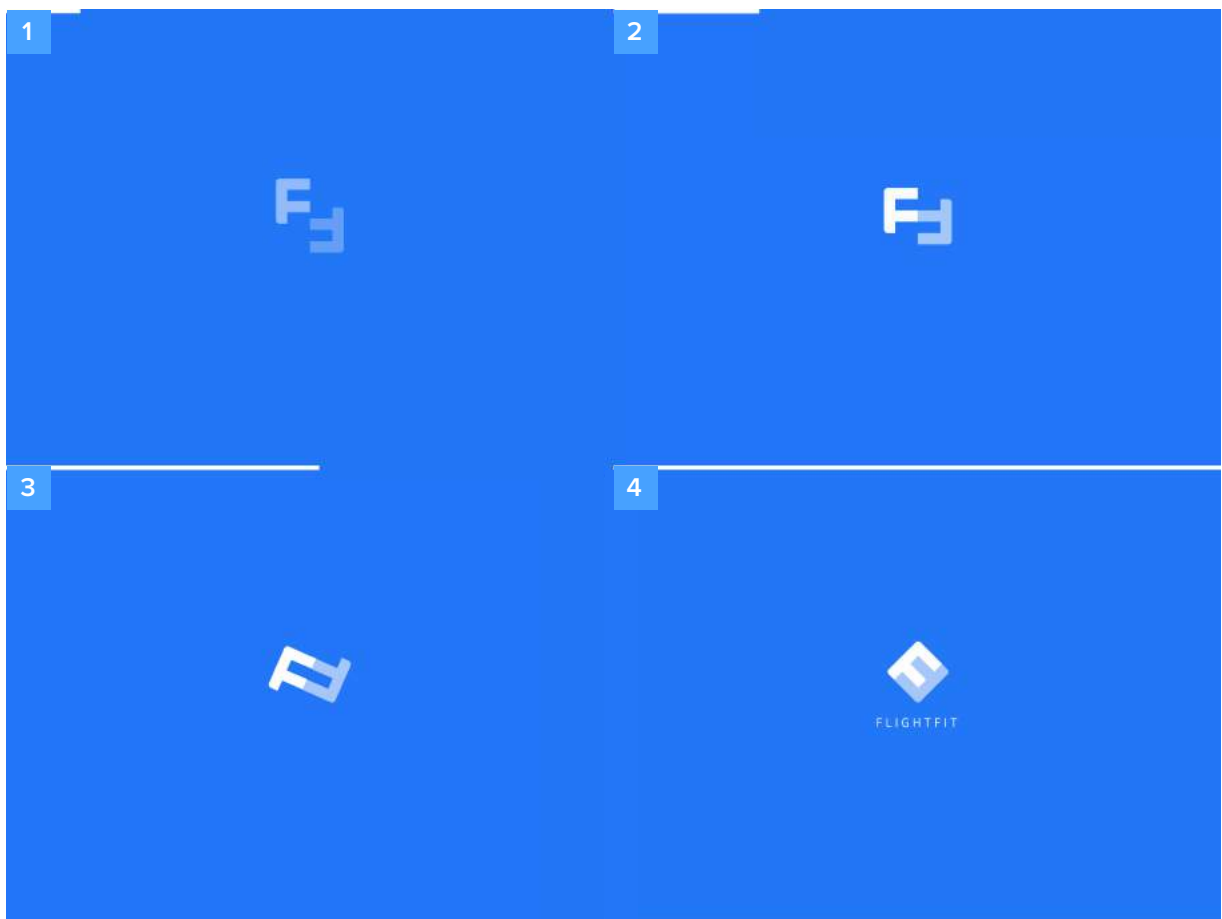


Figure 13.

Step-by-step animation process of the app logo

4.5.3 Typography

Typography is a way of communication with users. Appropriate typography speaks for itself setting the right mood and transferring a certain message to the target users. San Francisco is a neo-grotesque sans-serif typeface made by Apple Inc. Because the thesis project is designed for iOS platform, San Francisco was selected to be the primary typeface for this project. It conveys a friendly and calm feeling for users which would help them quickly decode content hierarchy. The following content shows what typefaces are used in this application.

SF UI Display Medium

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
0123456789!@#\$\$%^&*()_+

SF UI Display Bold

**ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
0123456789!@#\$\$%^&*()_+**

SF UI Text Regular

ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
0123456789!@#\$\$%^&*()_+

SF UI Text Bold

**ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
0123456789!@#\$\$%^&*()_+**

4.5.4 Color Palettes

Colors have the great impact on user's mood and behavior. Accurately chosen colors can advance the usability of the product. In order to enhance the inflight experience for air travelers, the sky blue was chosen as the main color for the thesis project. The color scheme was based on the sky blue with various tones and shades of it. Moreover, the warm orange was selected to match the blue color, which brings the feelings of excitement, motivation, and enthusiasm.

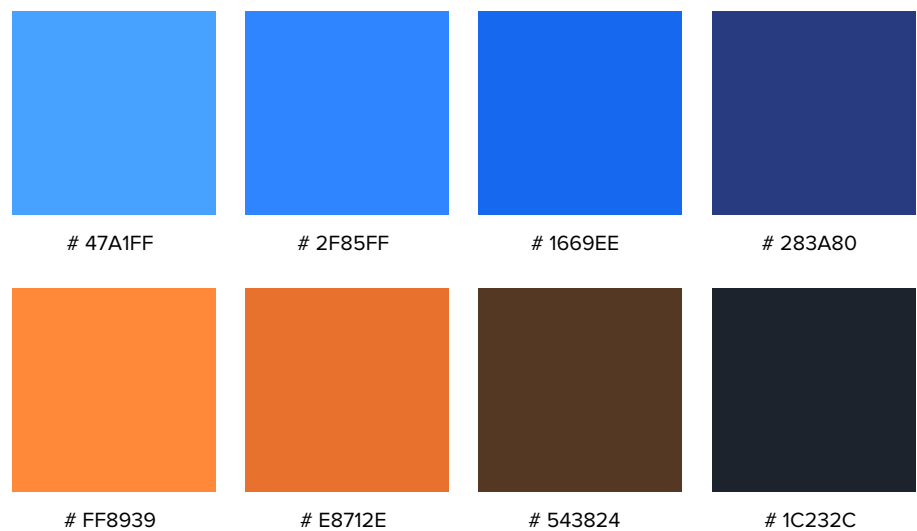


Figure 14.
Color palettes
with Hex code

4.6 / 4 Design Process

App Design

4.6.1 Layout & Grids

The thesis project used 8px grid system as the guidance. The iPad app uses a 2048 * 1536 px (Horizontal) screen with margins of 120 px for all edges.

The iPhone app uses a 750 * 1334 px (Vertical) screen with margins of 96 px for all edges.

Figure 15.1.
Layout design of
iPad app

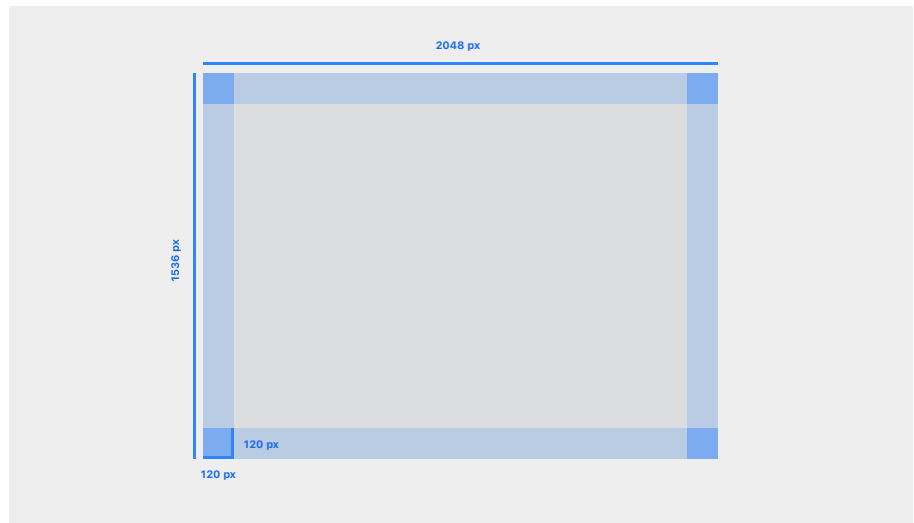
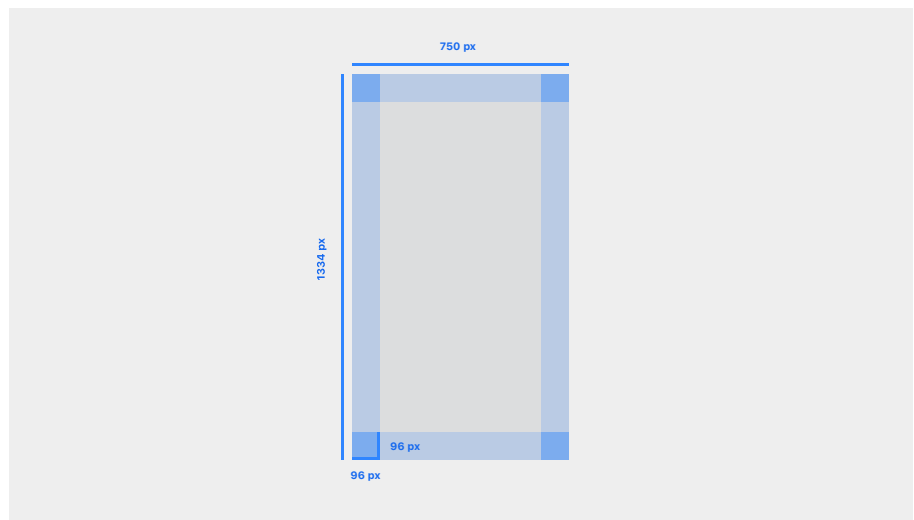


Figure 15.2
Layout design of
iPhone app



4.6.2 Sketches

Drawing sketches to explore the different UX solutions of the application is the fundamental basis for the whole app design process.

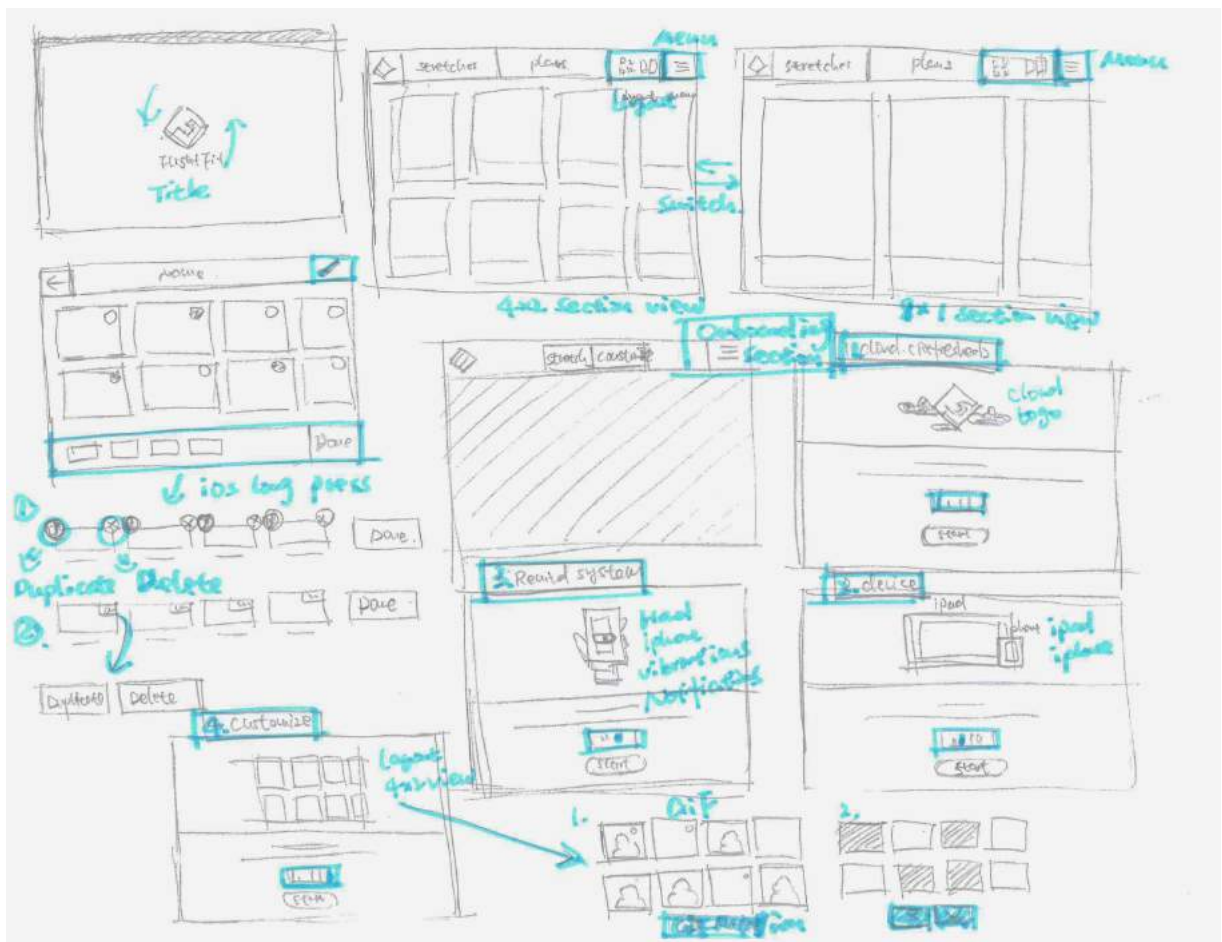


Figure 16.1.
App sketches A

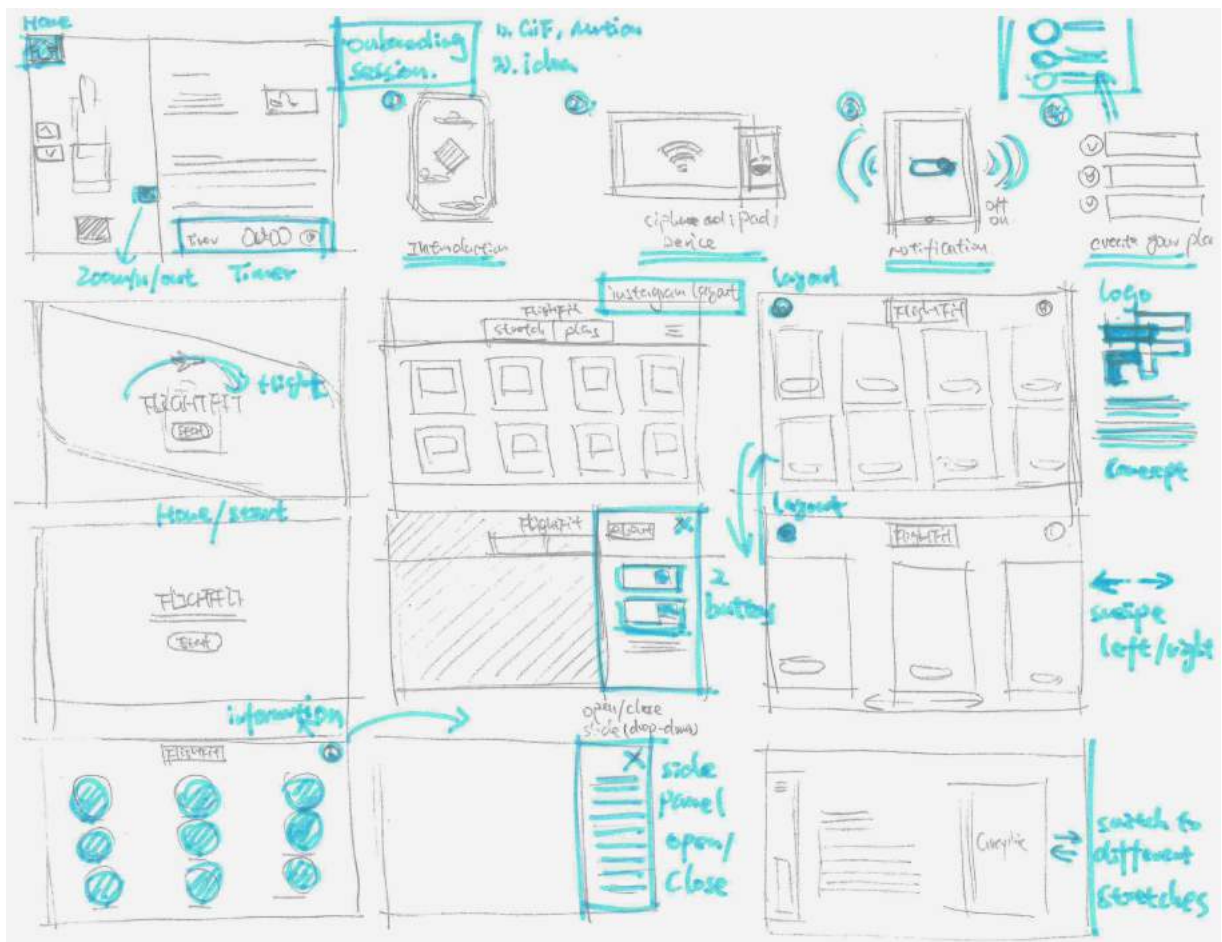


Figure 16.2.
App sketches B

4.6.3 Wireframes

Low-Fidelity Wireframes

Low-fidelity wireframes can be easily produced to branch out ideas.

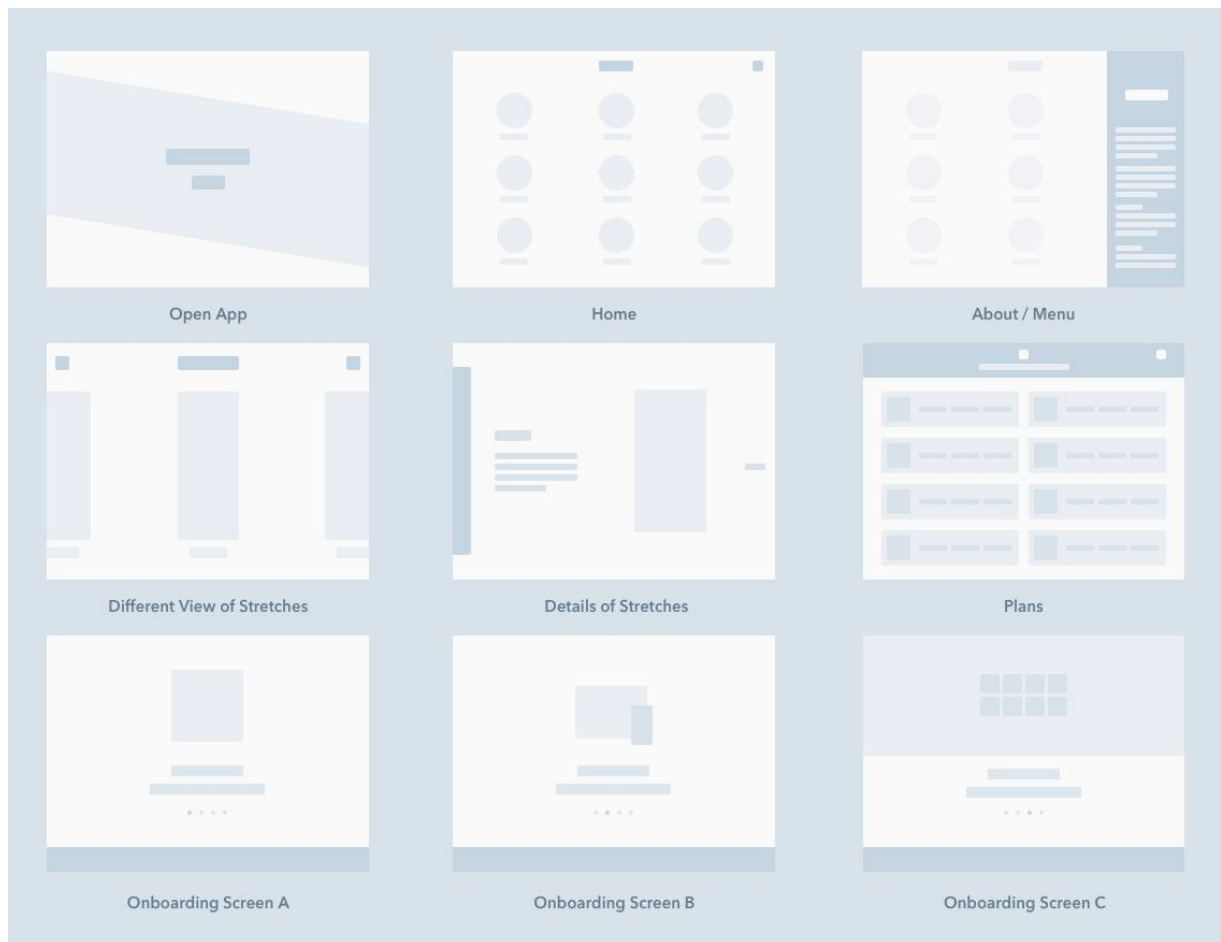


Figure 171.

Lo-Fi wireframes of the iPad app



Figure 17.2.

Lo-Fi wireframes of the iPhone app

High-Fidelity Wireframes

High-fidelity wireframes are helpful in providing a clear idea of the interface.

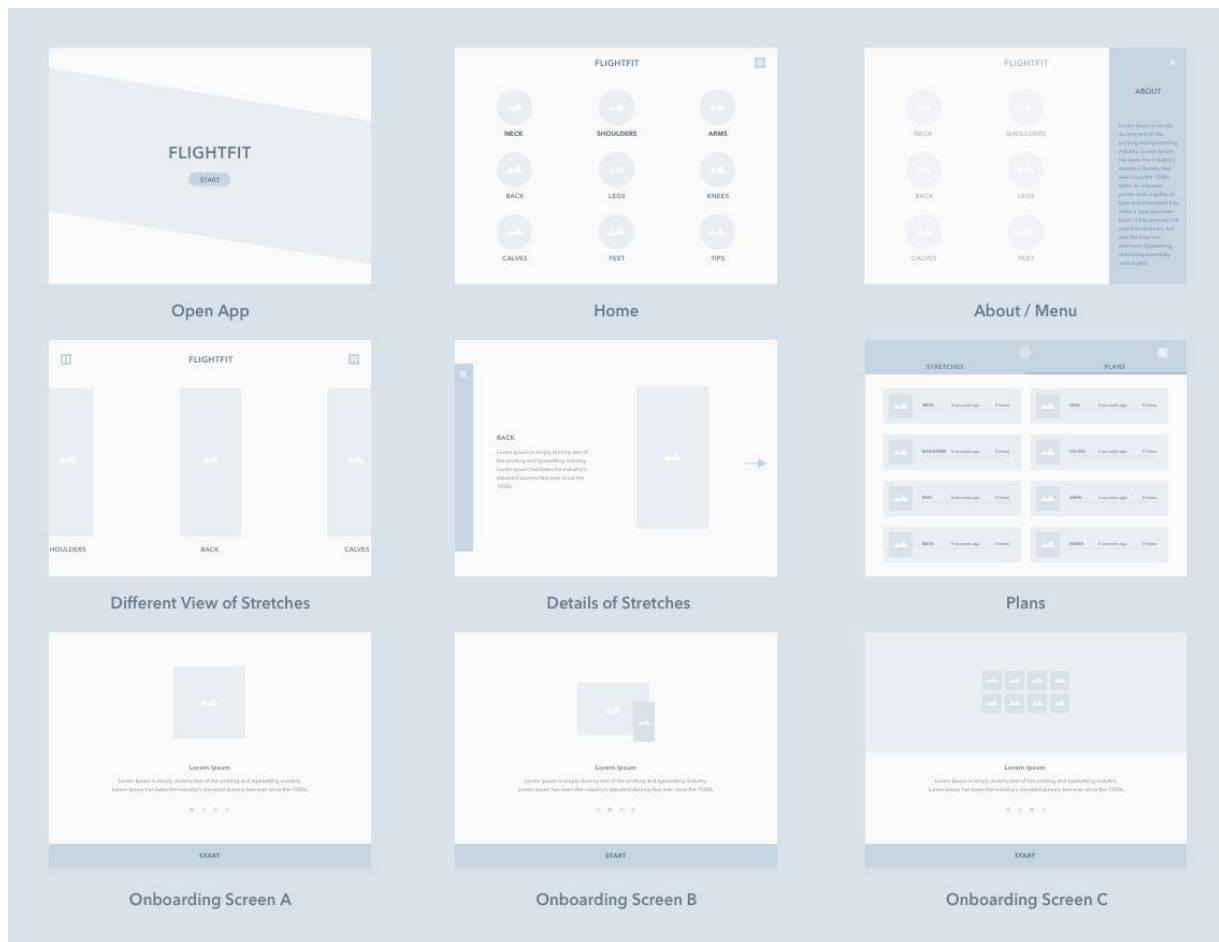


Figure 18.1.

Hi-Fi wireframes of the iPad app

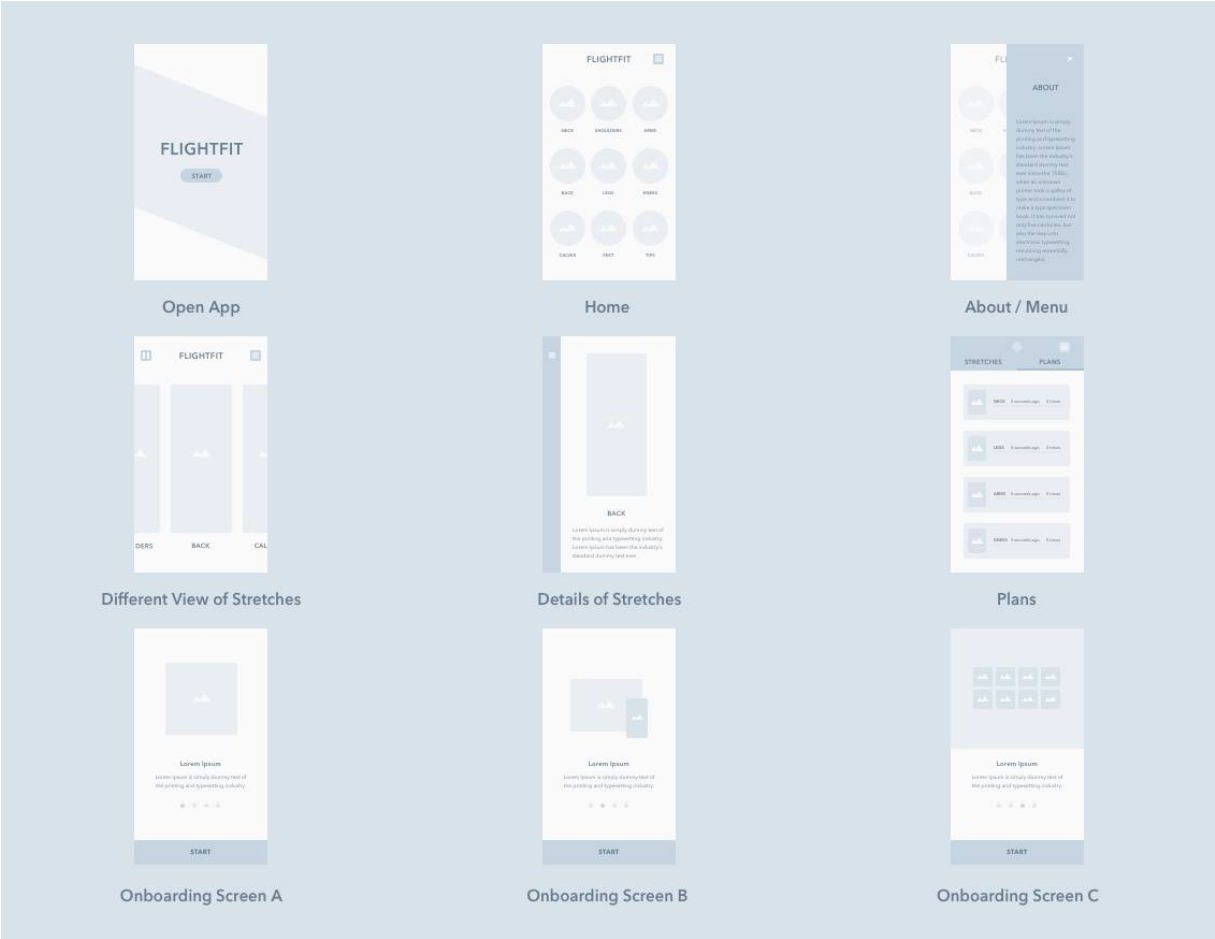


Figure 18.2.
Hi-Fi wireframes of the iPhone app

4.6.4 Final App Design

FlightFit, is an iOS application (iPad and iPhone) designed specifically for air travelers, which helps air travelers minimize the risk of blood clotting and mitigate against achy muscles during long flights. The whole application can be divided into five main sections: Launch the App, Onboarding, Default Stretches, My Plans, and Menu. Adobe Illustrator was used to create characters, stretches, icons and logo of the application, Sketch was primary used to design the whole interface.

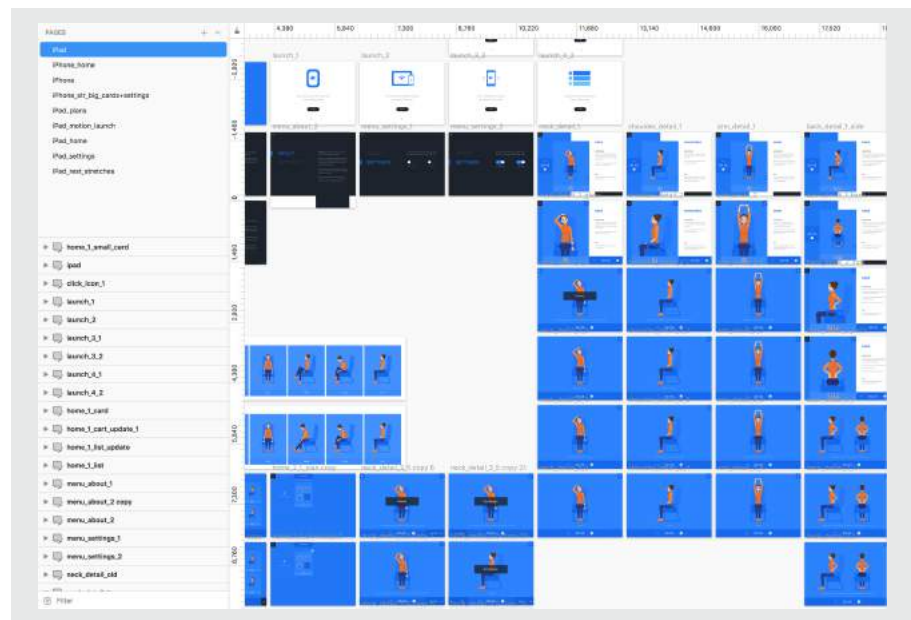


Figure 19.1.

Sketch working files of iPad interface design

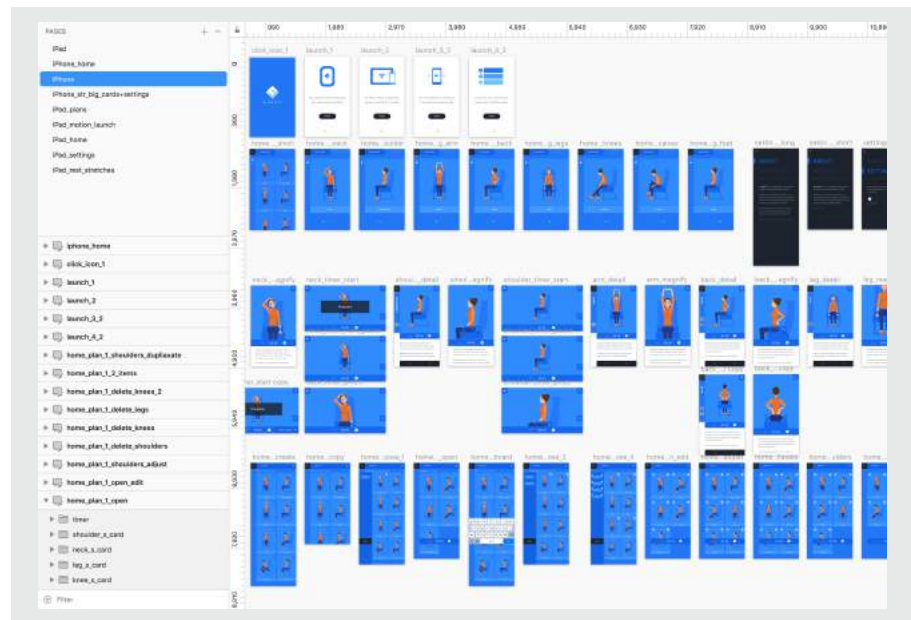


Figure 19.2.
Sketch working files of iPhone interface design

Launch the App

When users click the icon to open the application, they would see an automatic animation about the app logo, and a white progress bar on the top of the screen which shows where they are at this stage.

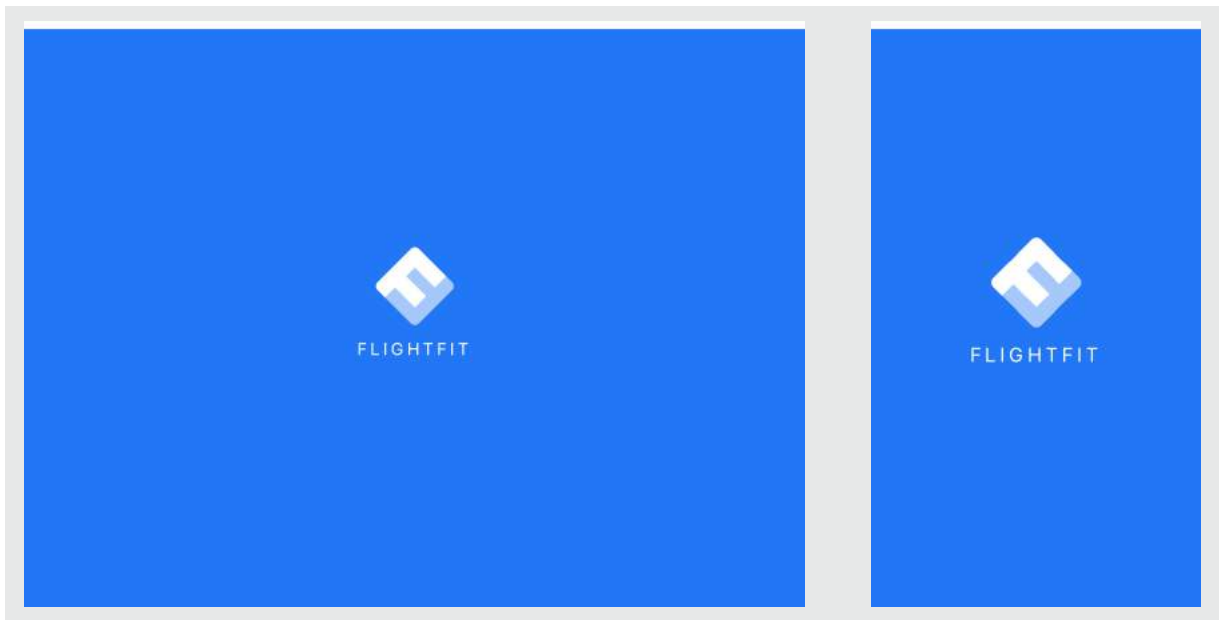


Figure 20.

Logo animation on iPad and iPhone

Onboarding

After watching the logo animation, users would go to the onboarding section which shows the key features of the application. The whole section consists of four parts: Introduction, Wi-Fi service & Device, Notification System, and Customized Plans.

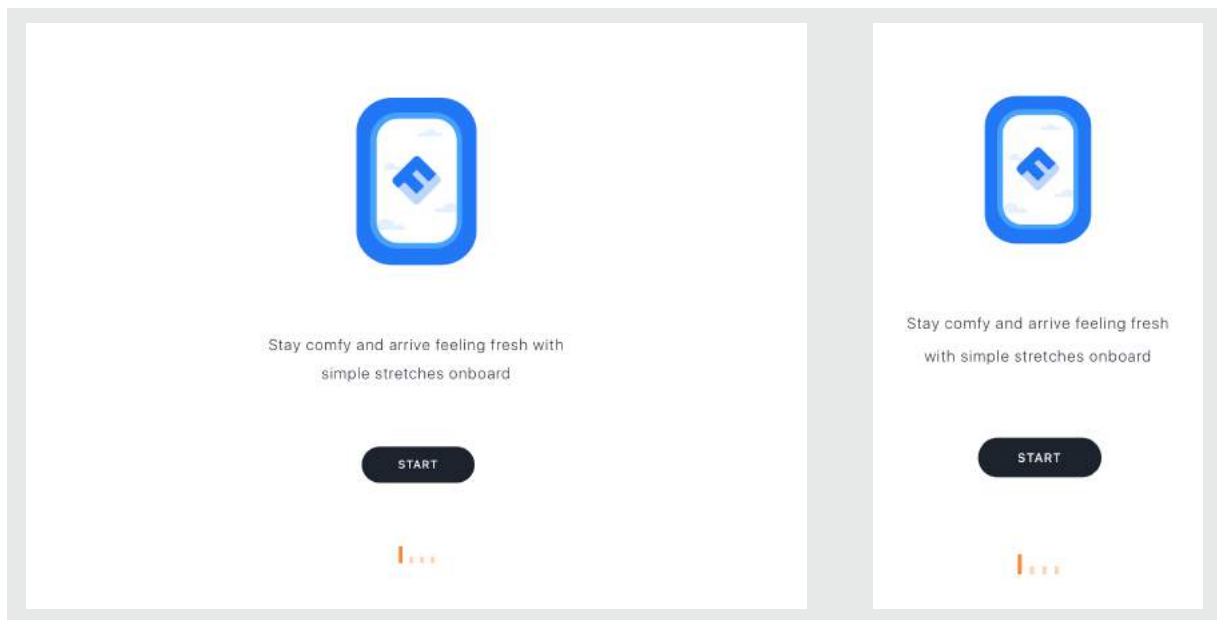


Figure 21.1.

Onboarding screen A: A brief introduction of FlightFit
(left: iPad, right: iPhone)

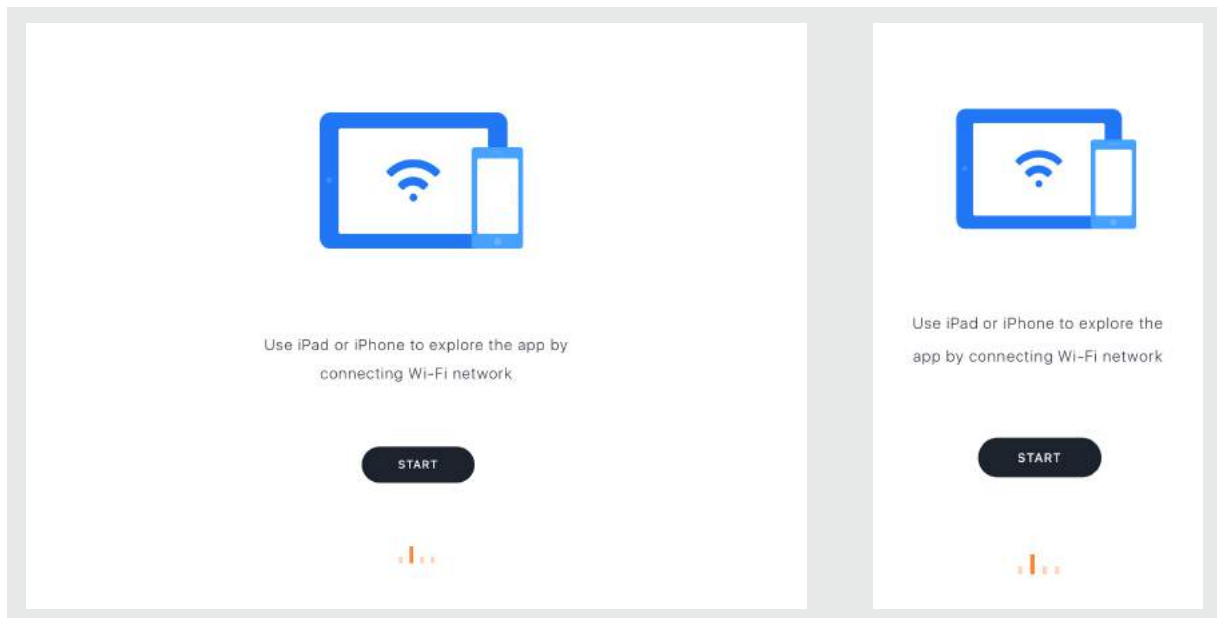


Figure 21.2.

Onboarding screen B: Inflight Wi-Fi service & Device

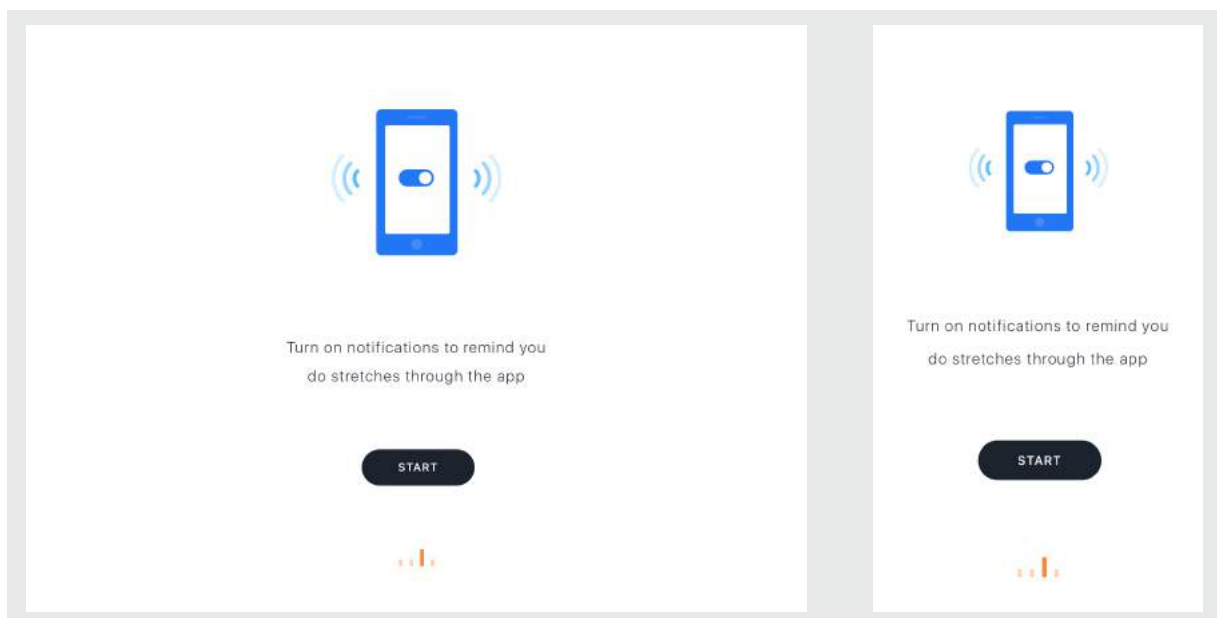


Figure 21.3.

Onboarding screen C: Notification system

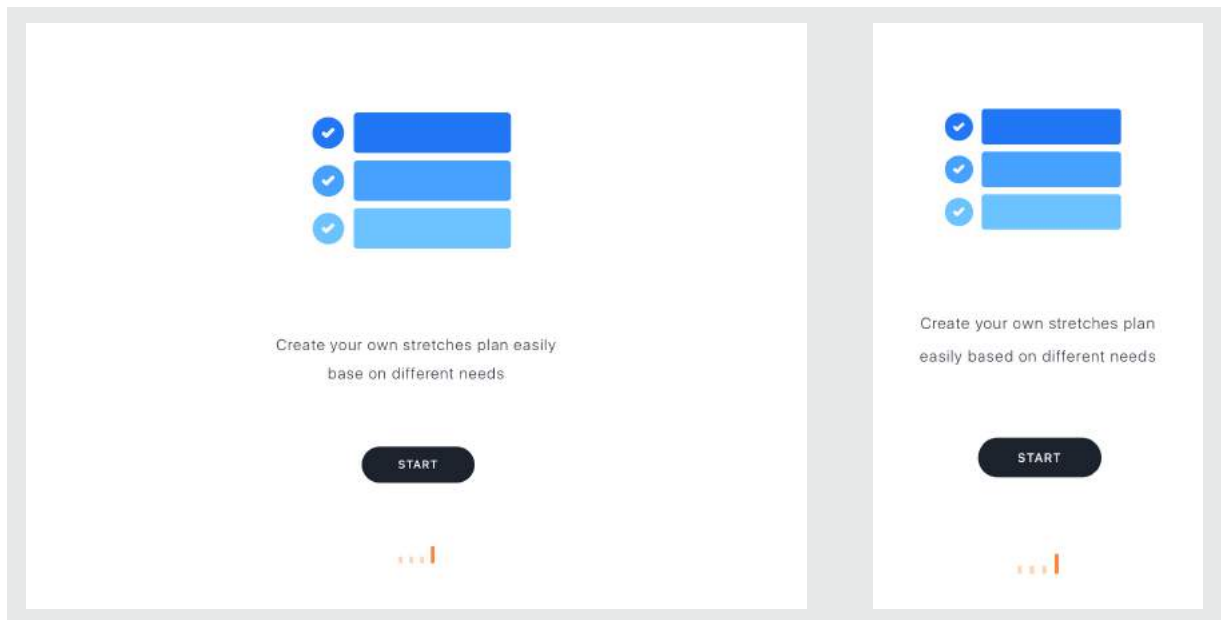


Figure 21.4.

Onboarding screen D: Customized plans

Default Stretches

After clicking “START” button on the onboarding section, users would go to the home page. FlightFit provides users eight seated inflight stretching techniques which cover eight main muscle groups of human body. FlightFit offers dynamic motion graphics for each stretch, which users can see them directly on this page.

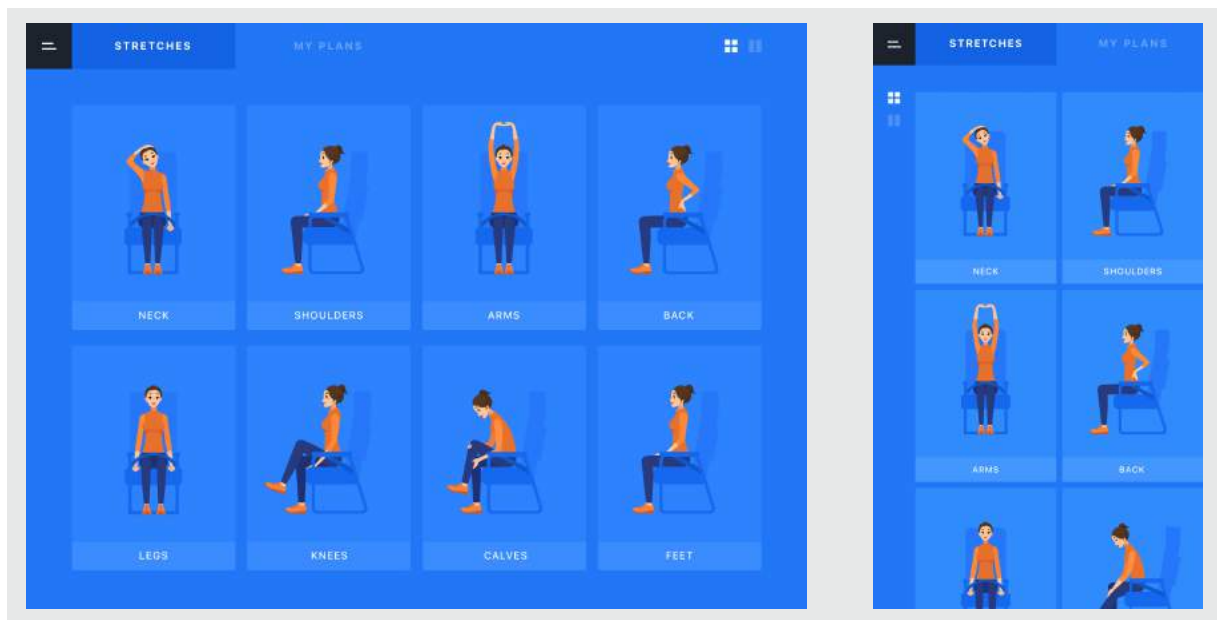


Figure 22.1.

Home screen with eight dynamic stretches
(left: iPad, right: iPhone)

Figure 22.2.
Users can click the “Display” icon
to change the stretching layout
(marked in red)

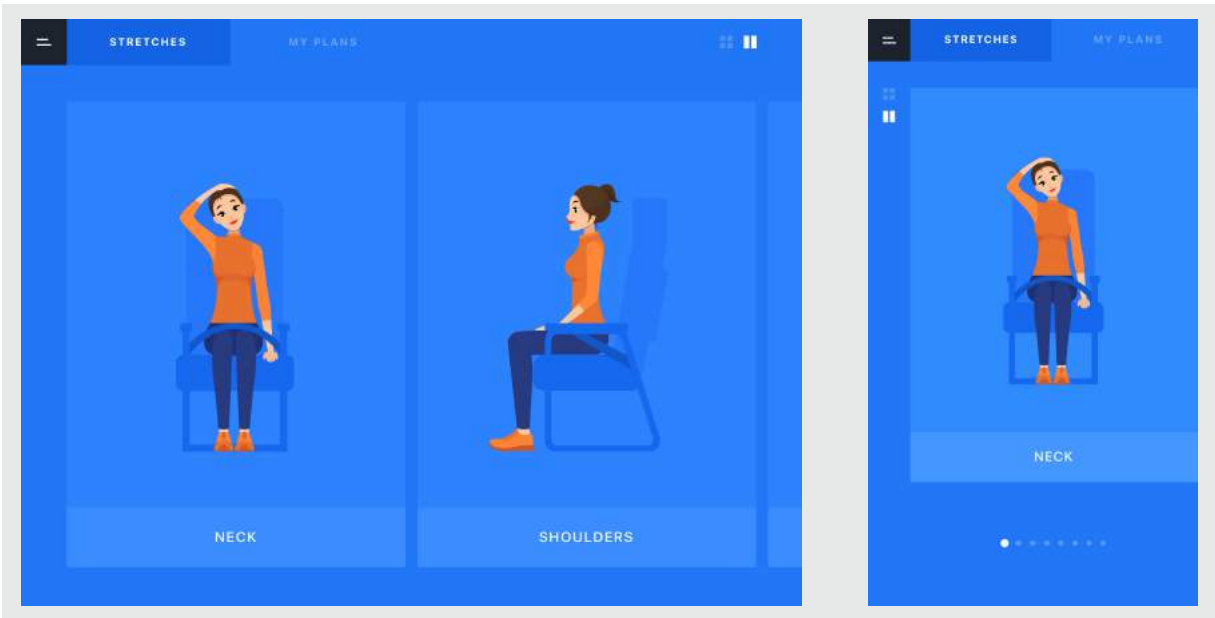
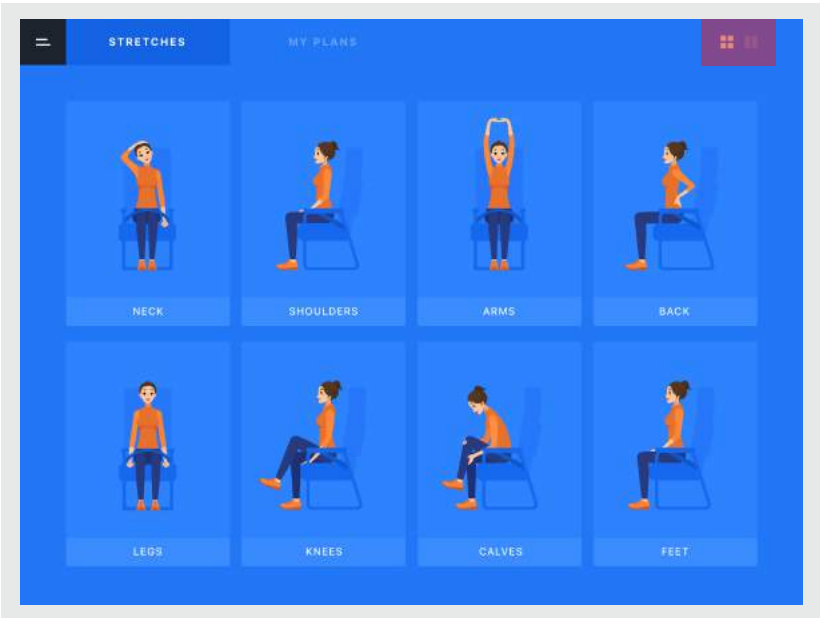


Figure 22.3.
Another display layout of the stretches on home screen

If users click one stretch, they would see more details of the specific stretch and the following contents are users can do on this page:

- Go back to home page
- Zoom in/out the stretch
- Start the timer to watch and follow the stretching video
- Switch to another stretch

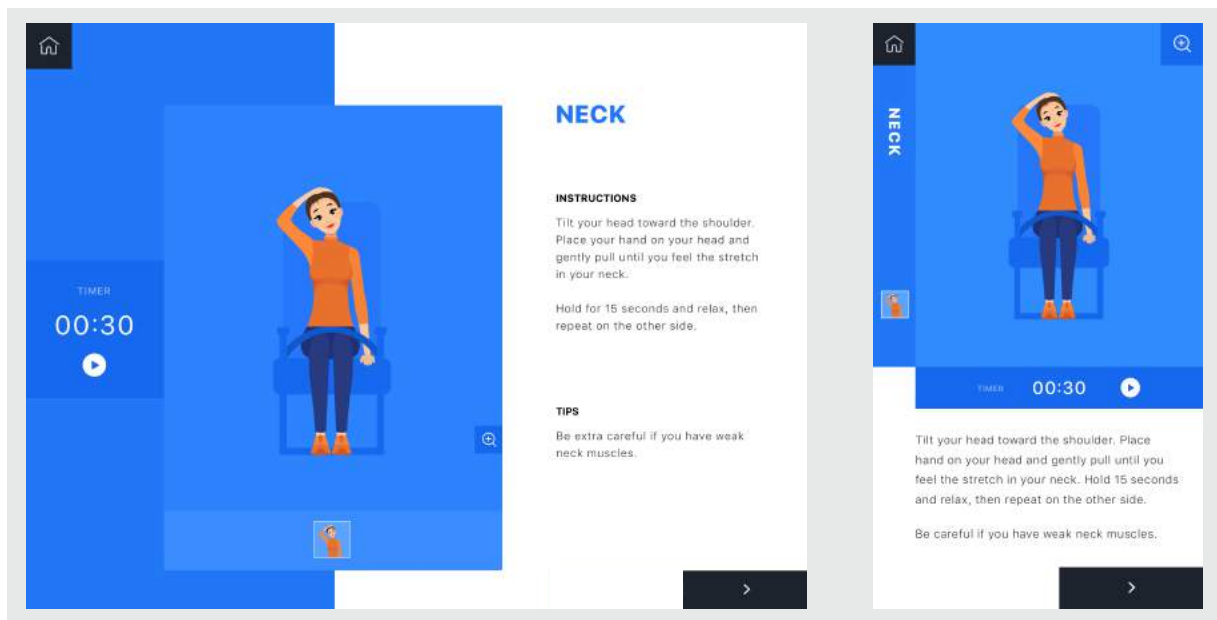


Figure 22.4.

Details of NECK stretch
(left: iPad, right: iPhone)

Figure 22.5.
Users can click the “Magnifying glass”
icon to zoom in/out the details
(marked in red)

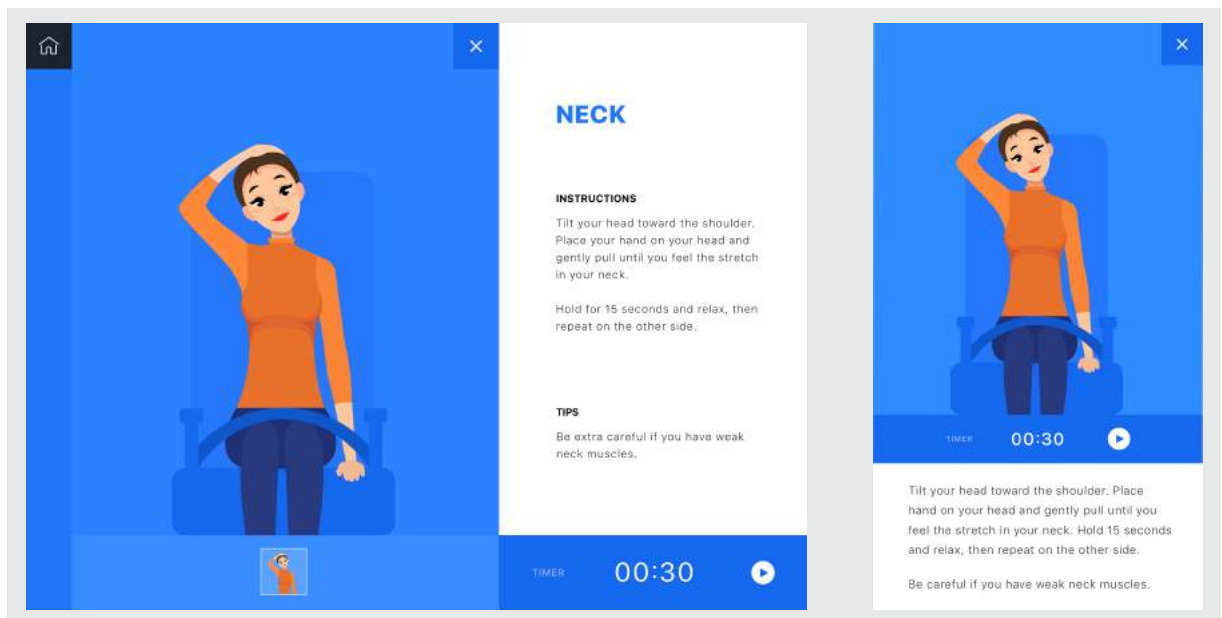
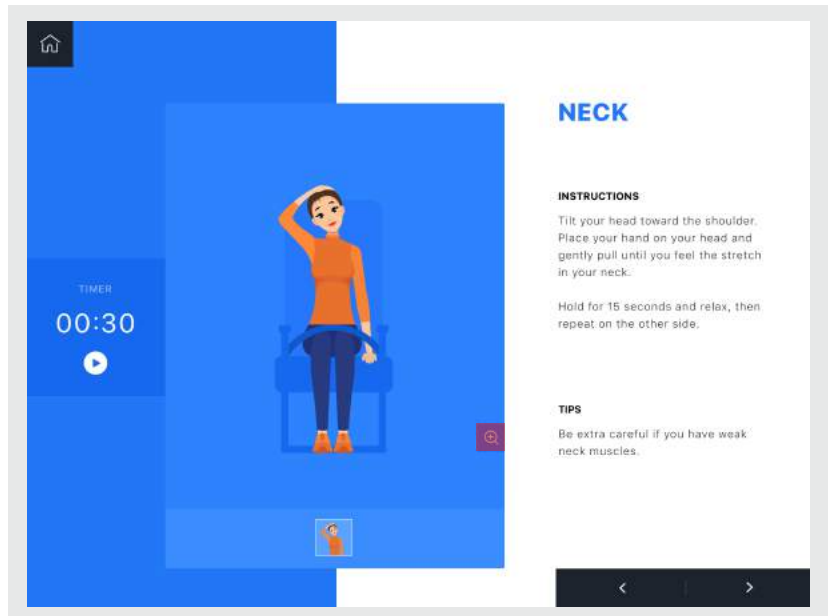


Figure 22.6.
Zoom In view of the stretch

Figure 22.7.

For BACK stretch, users can click the bottom “Thumbnails” to change the different view of the stretch (marked in red)

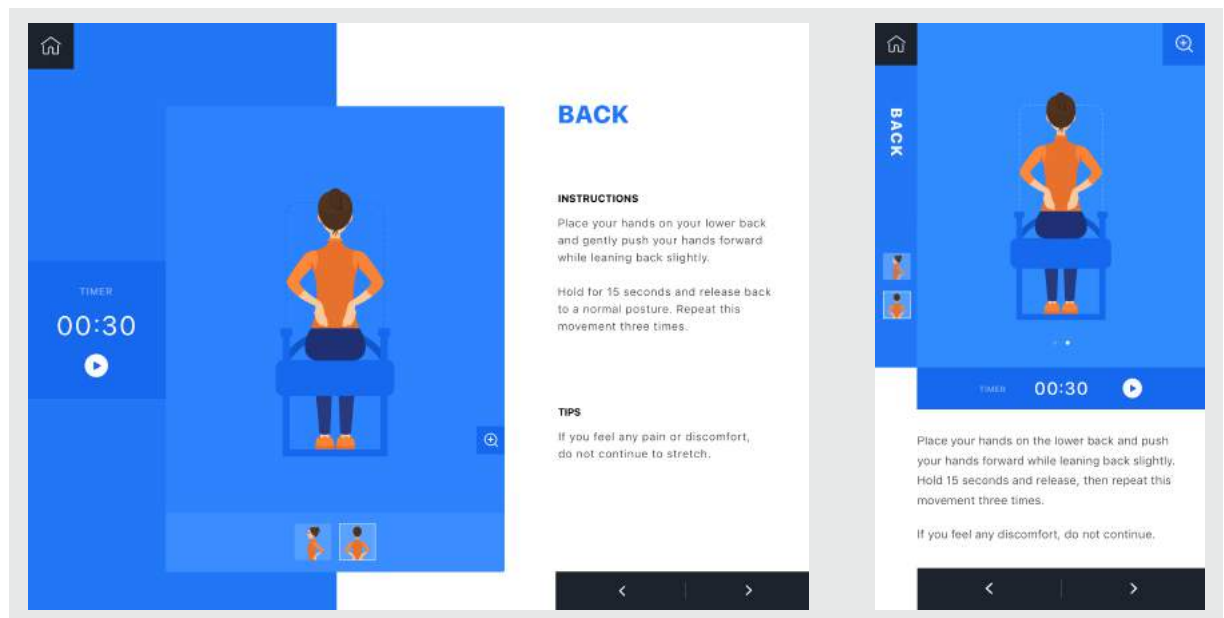
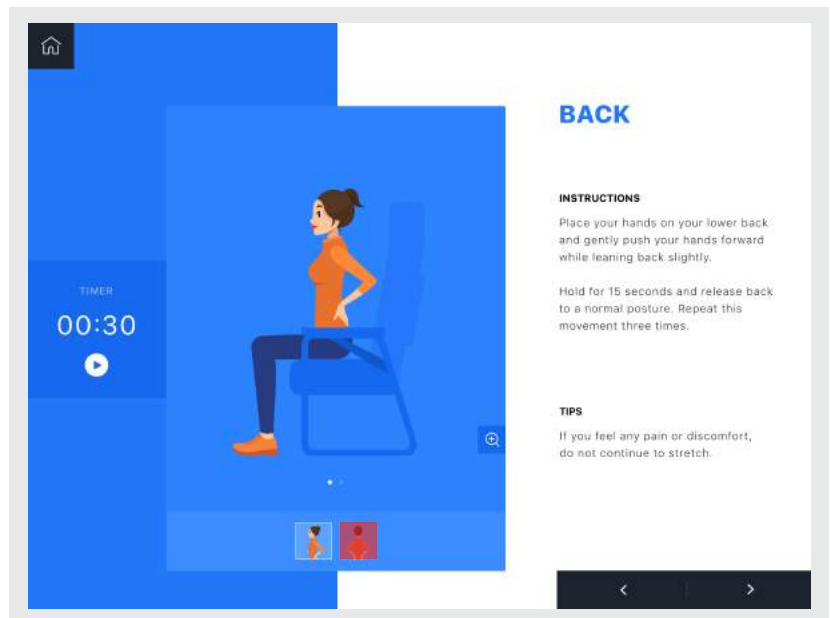


Figure 22.8.

Another view of the BACK stretch

Figure 22.9.

Users can click the “Timer” to watch and follow the stretching video. The system would help them calculate time automatically (marked in red, iPad)

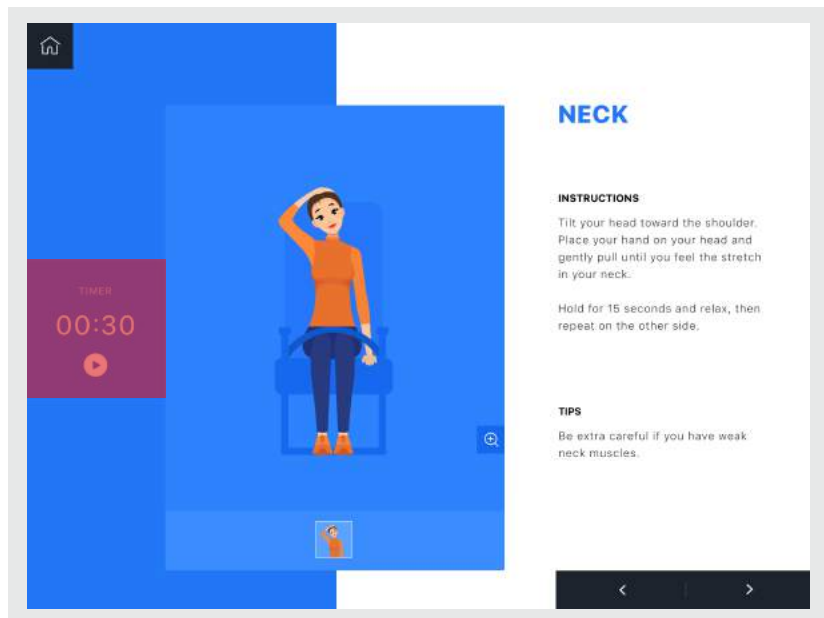


Figure 22.10.

Before the timer starts, users would have some time to prepare and get ready. During this section, users can:

- Turn on/off the audio
- Exit the timer section
- Rewatch/ Pause/ Play the stretching video

(iPad)

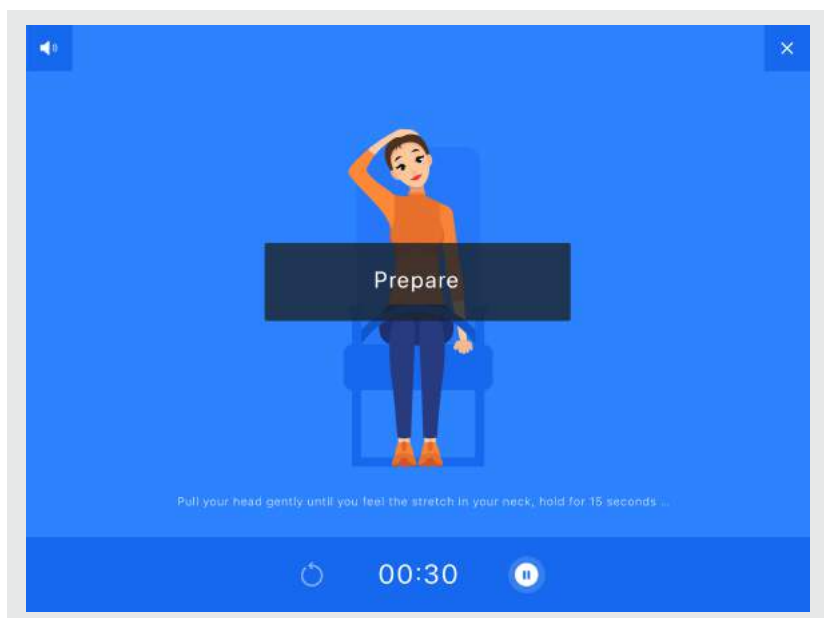
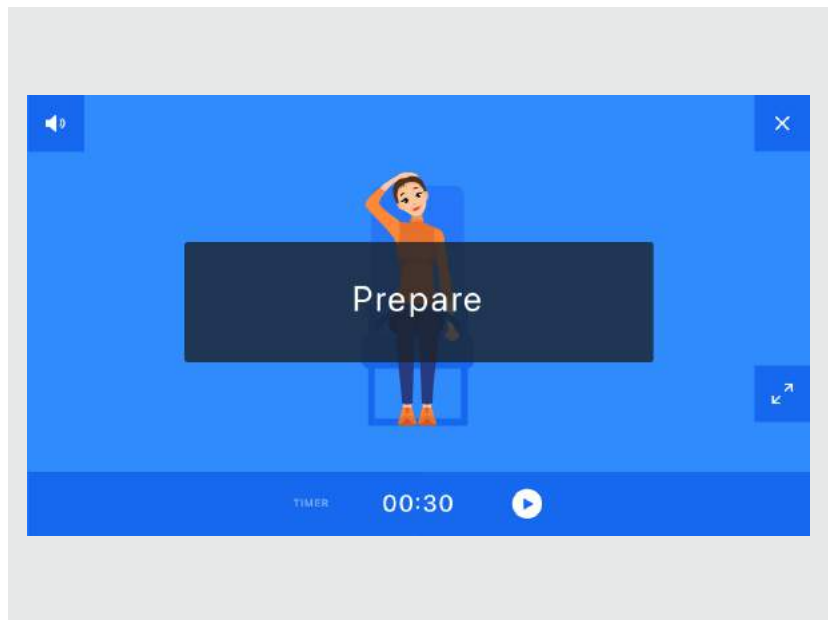


Figure 22.11.

If users click the “Timer” on iPhone, they would get a horizontal screen of the stretching video (iPhone)



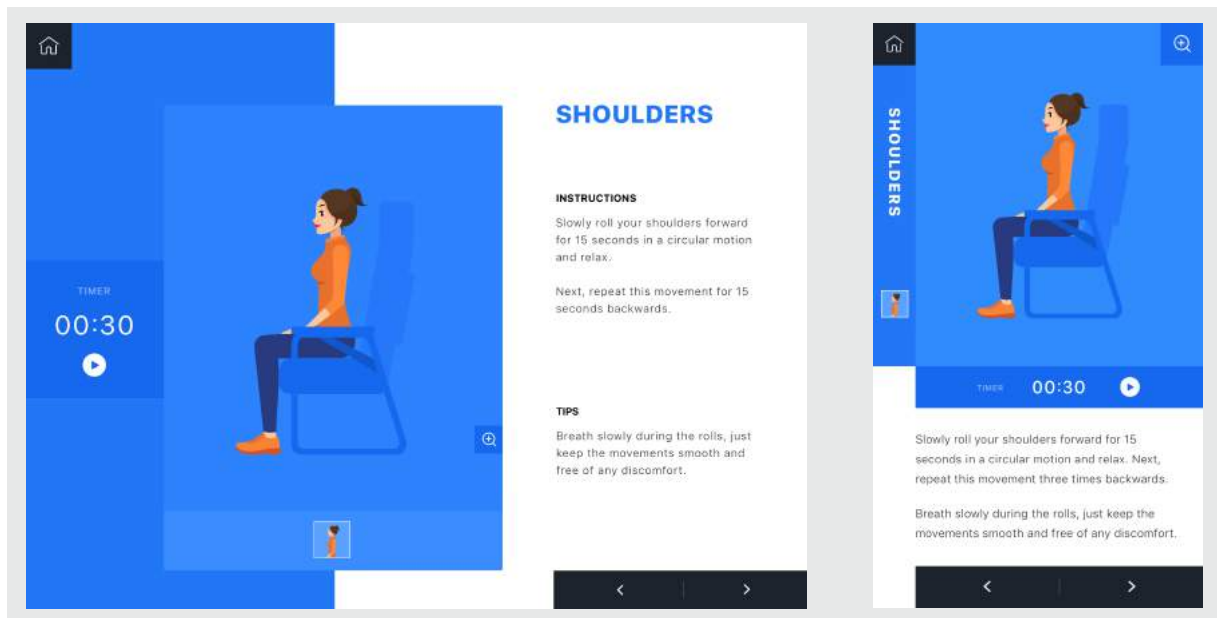


Figure 22.12.
Details of SHOULDERS stretch

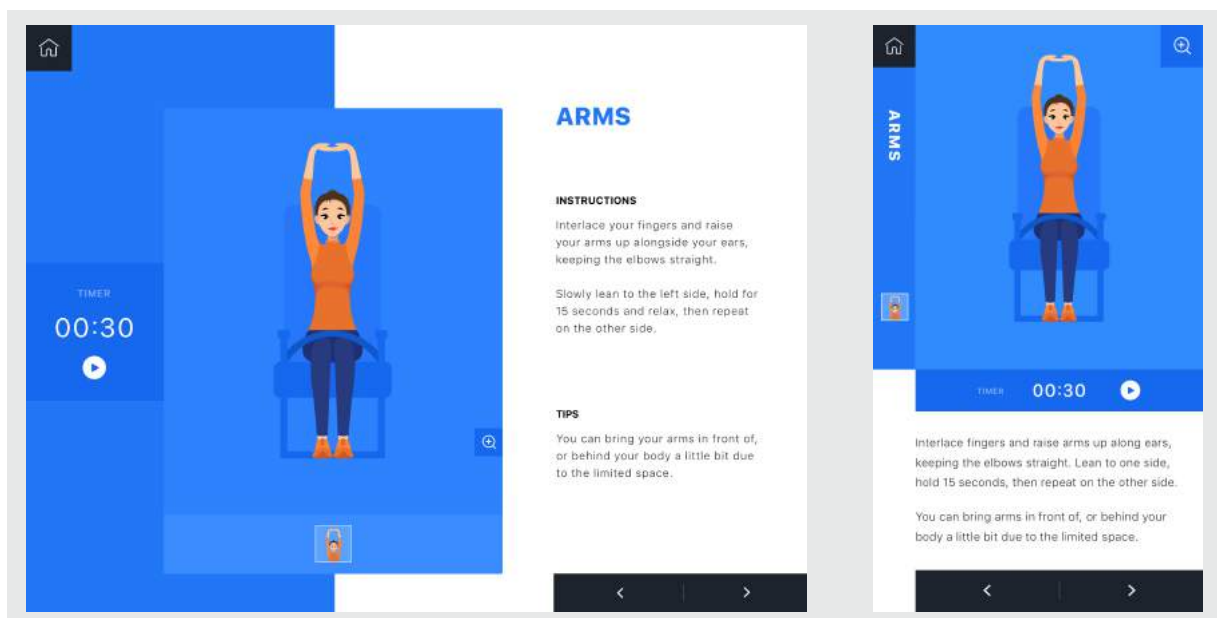


Figure 22.13.
Details of ARMS stretch

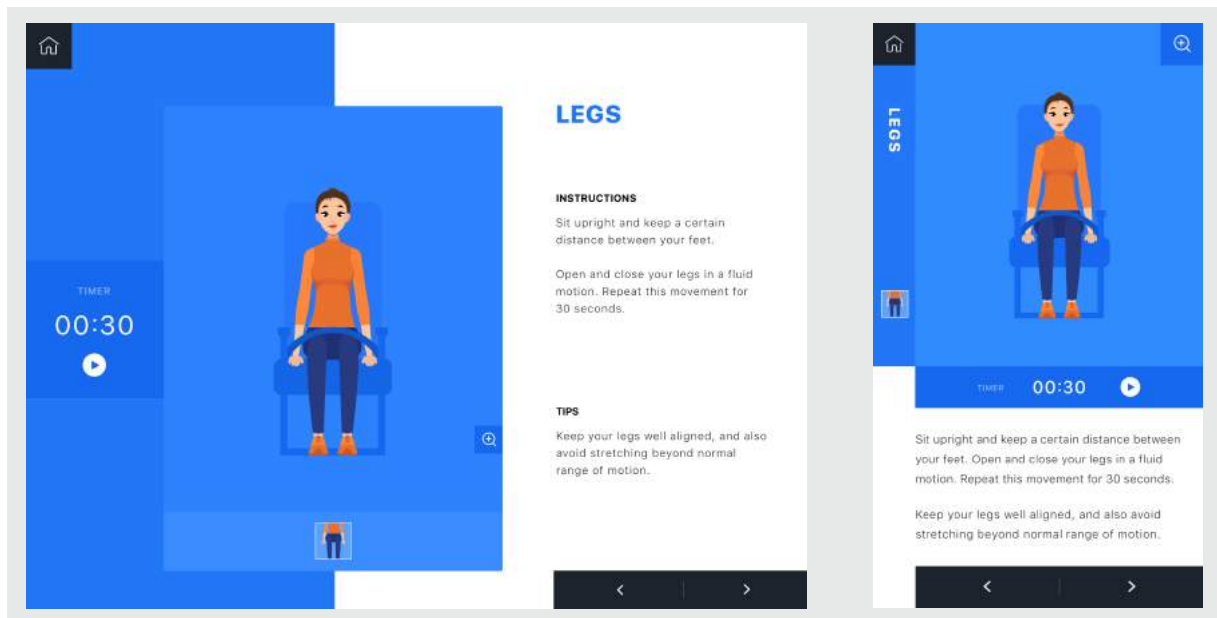


Figure 22.14.
Details of LEGS stretch

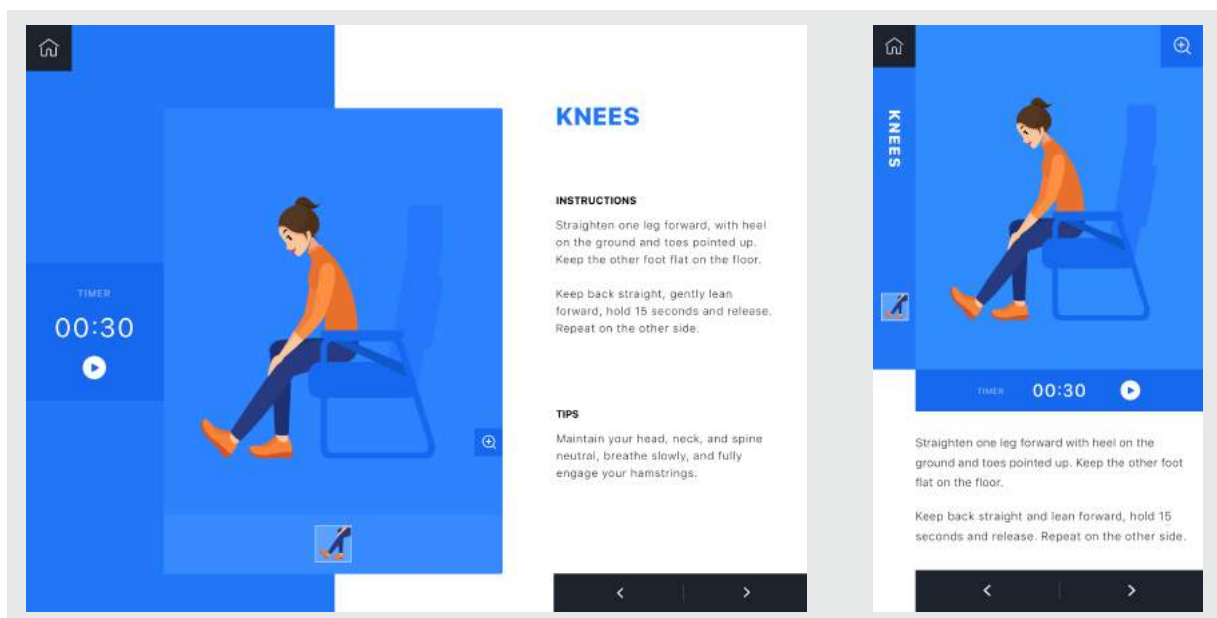


Figure 22.15.
Details of KNEES stretch

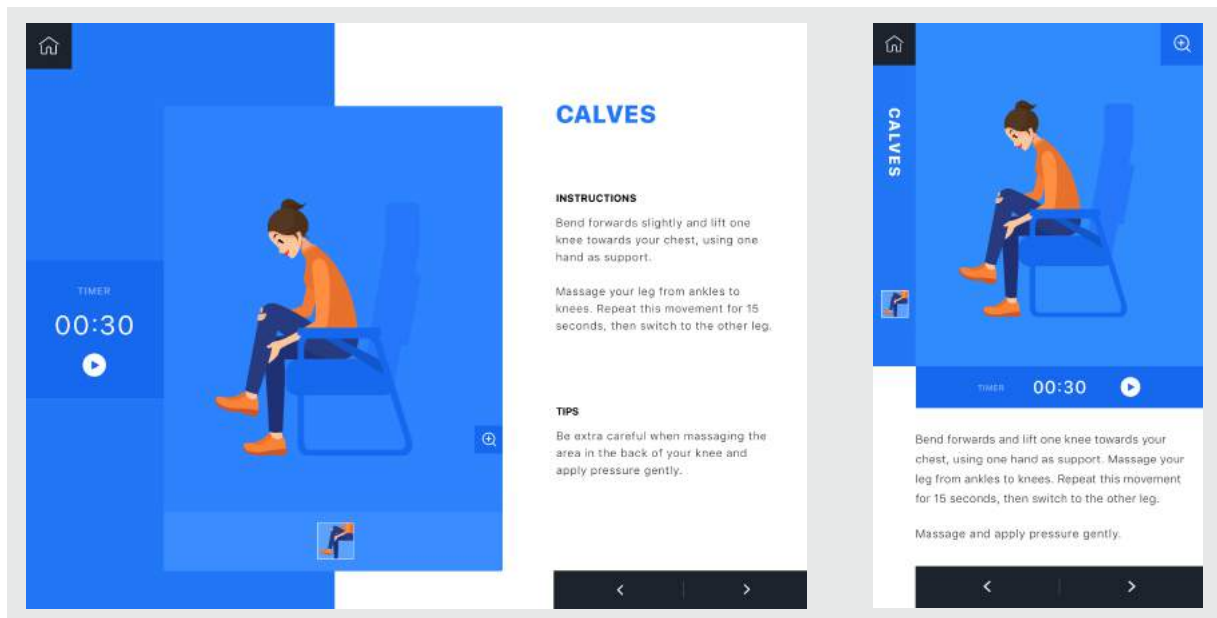


Figure 22.16.
Details of CALVES stretch

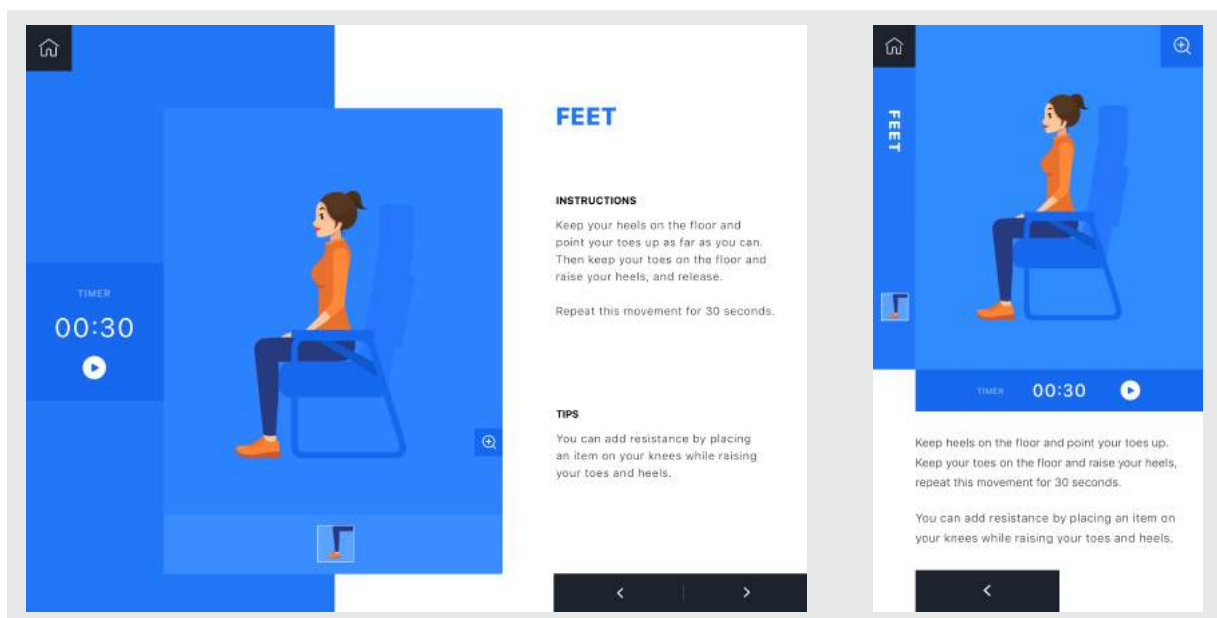


Figure 22.17.
Details of FEET stretch

My Plans

Users can also create their own plans through the application. They can simply click the “MY PLANS” tab to switch from “Stretches”. And also, there would have tips, notifications, and instructions to help users complete the creating process from beginning to the end.

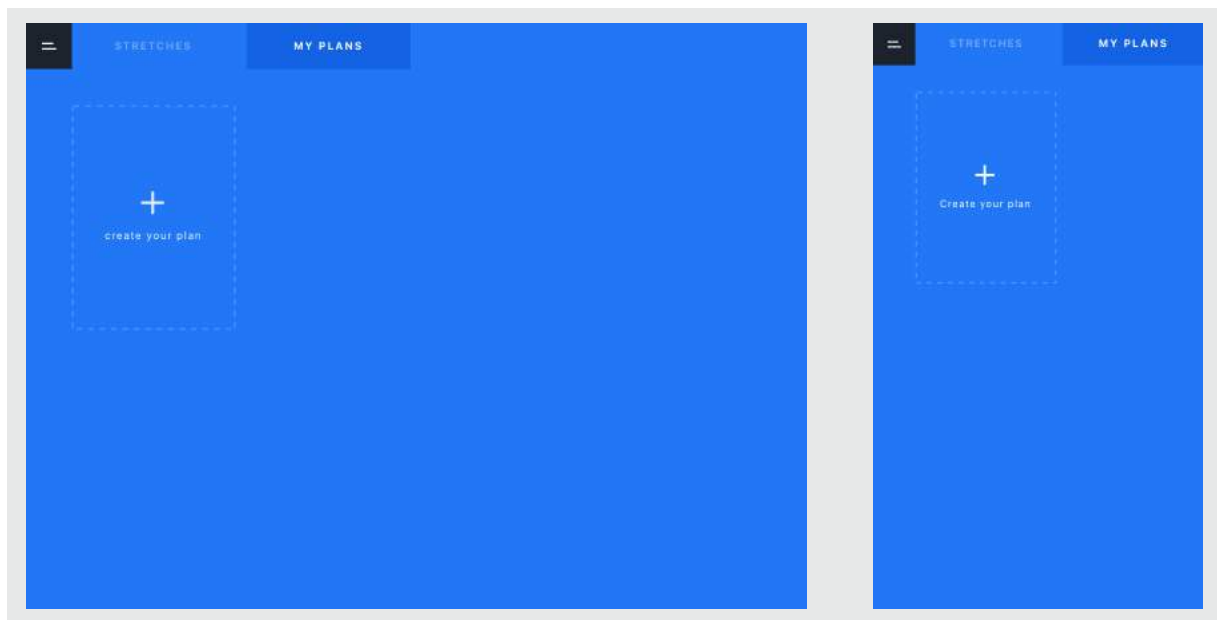


Figure 23.1.
MY PLANS section
(left: iPad, right: iPhone)

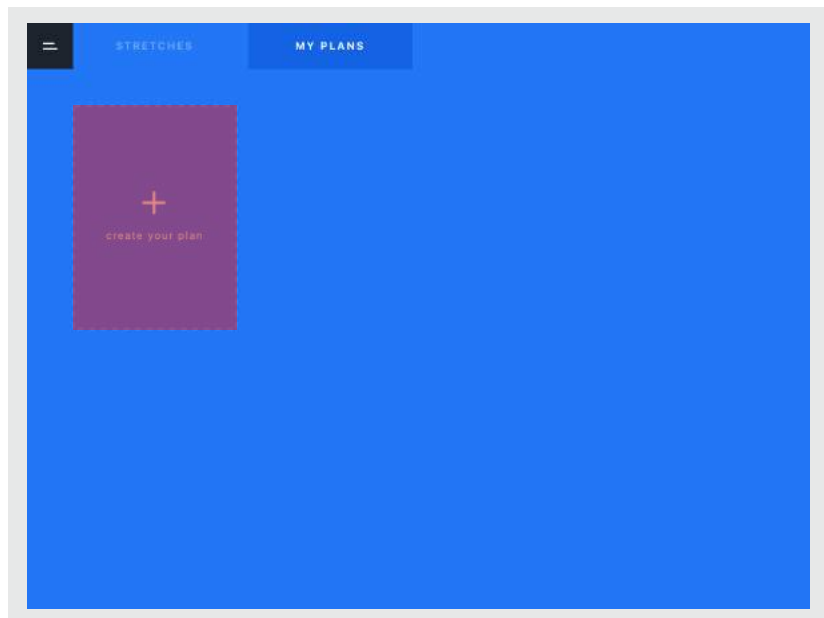


Figure 23.2.

Users can click the “create your plan” widget to start the creating process (marked in red)

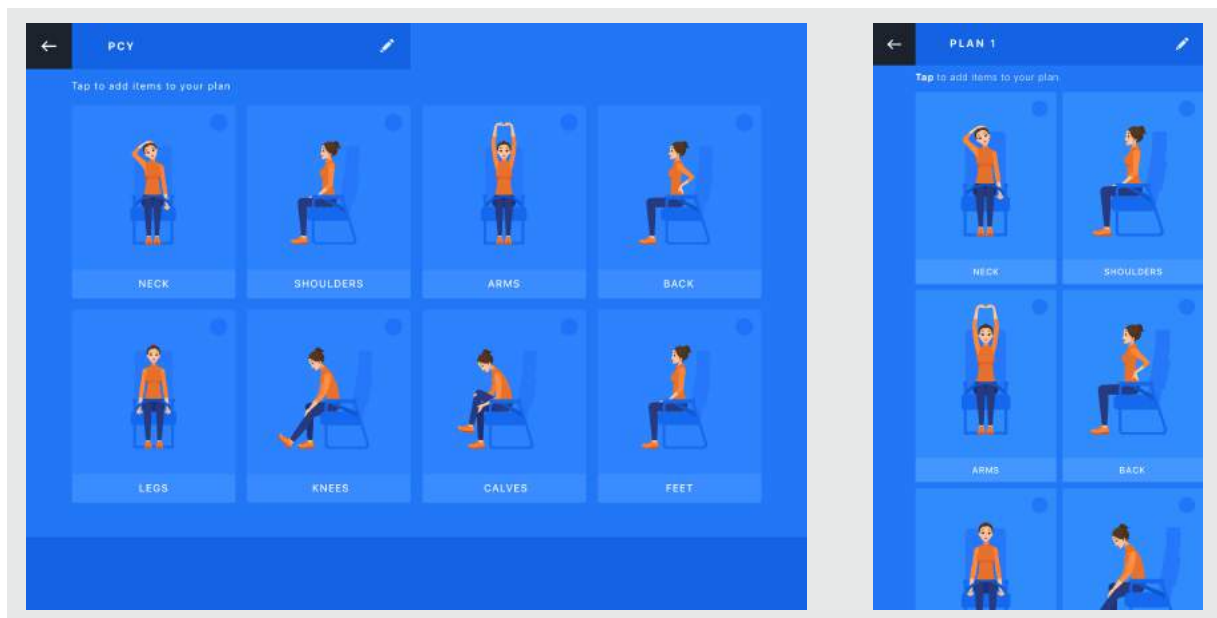


Figure 23.3.

App interface after clicking “create your plan”

Figure 23.4.

Users can click the “pencil” icon to edit the name of stretching plan (marked in red)

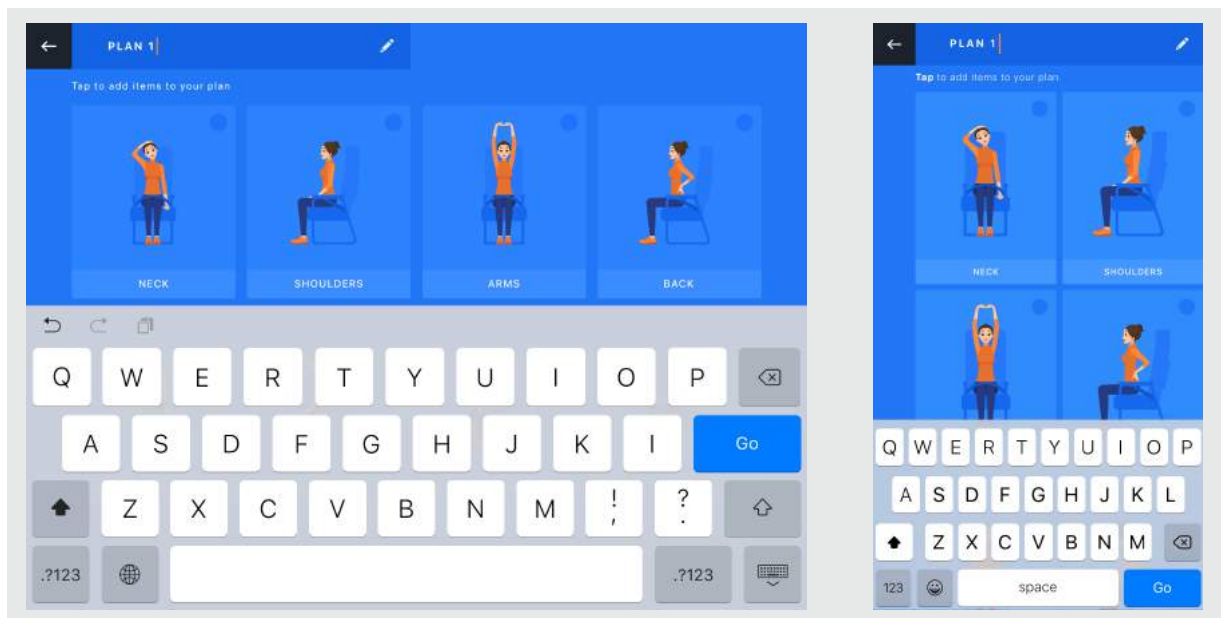
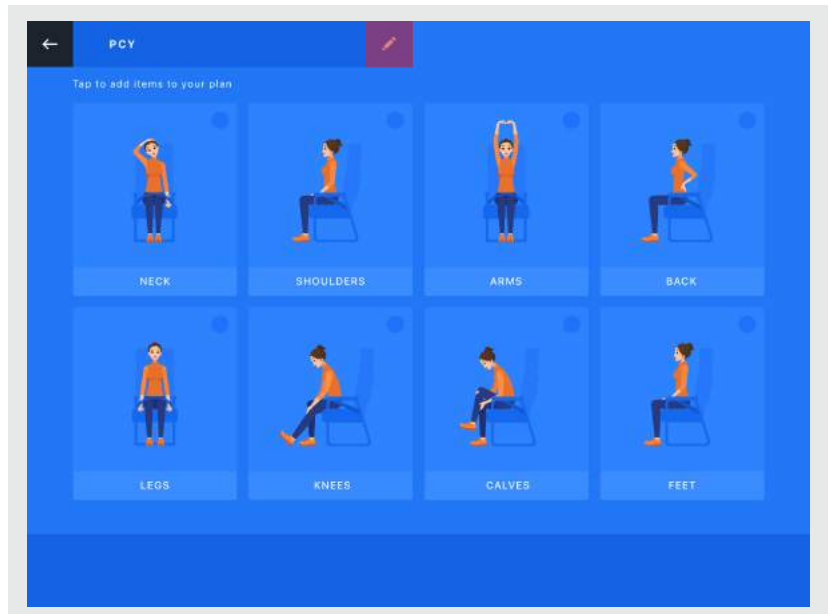


Figure 23.5.

App interface after clicking “pencil” icon

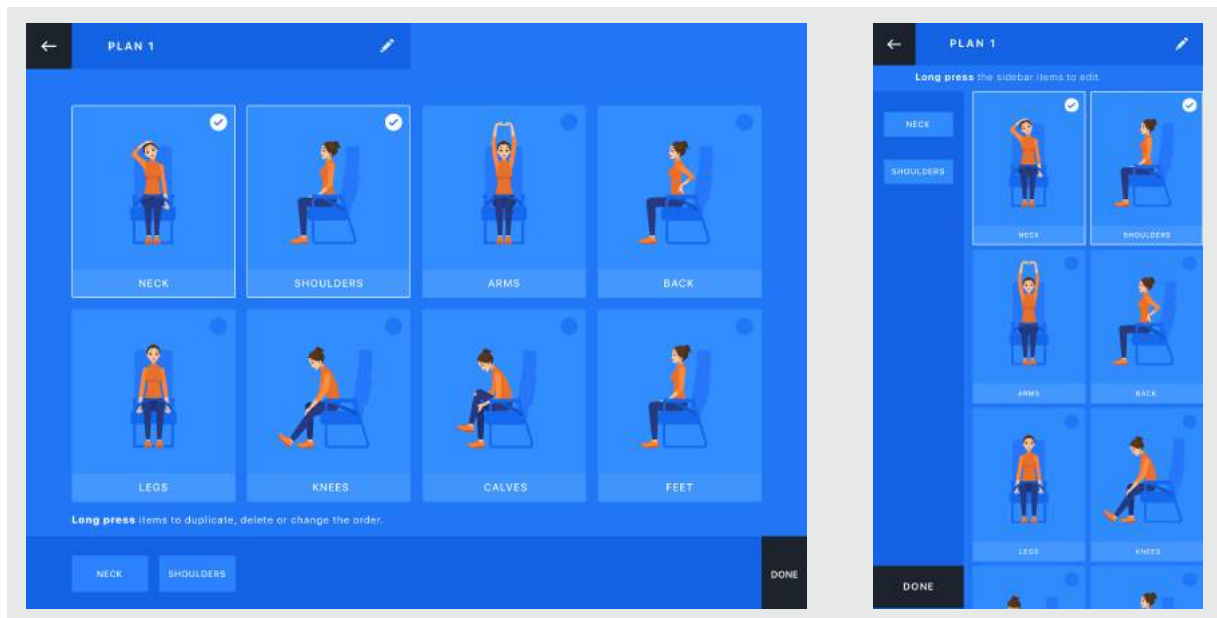


Figure 23.6.

Users can click/unclick to add/remove the stretch in the plan

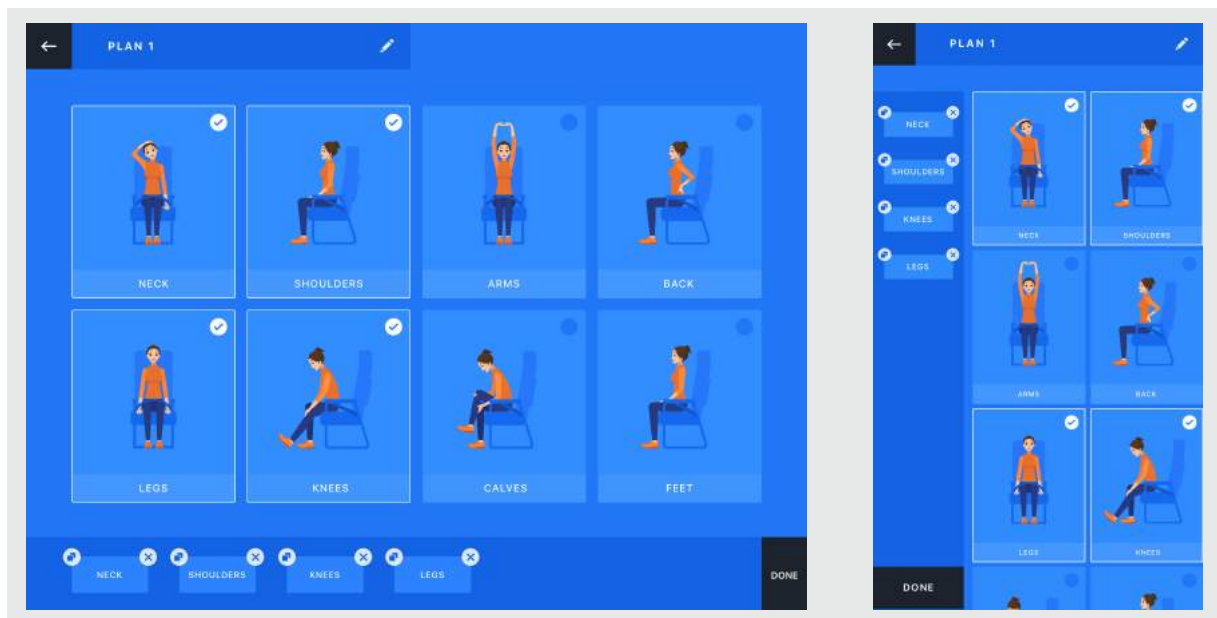


Figure 23.7.

Users can long press the bottom stretches to edit items, they can duplicate, delete, and change order of the stretches

Figure 23.8.

Users can click the “DONE” button to complete the creating process (marked in red)

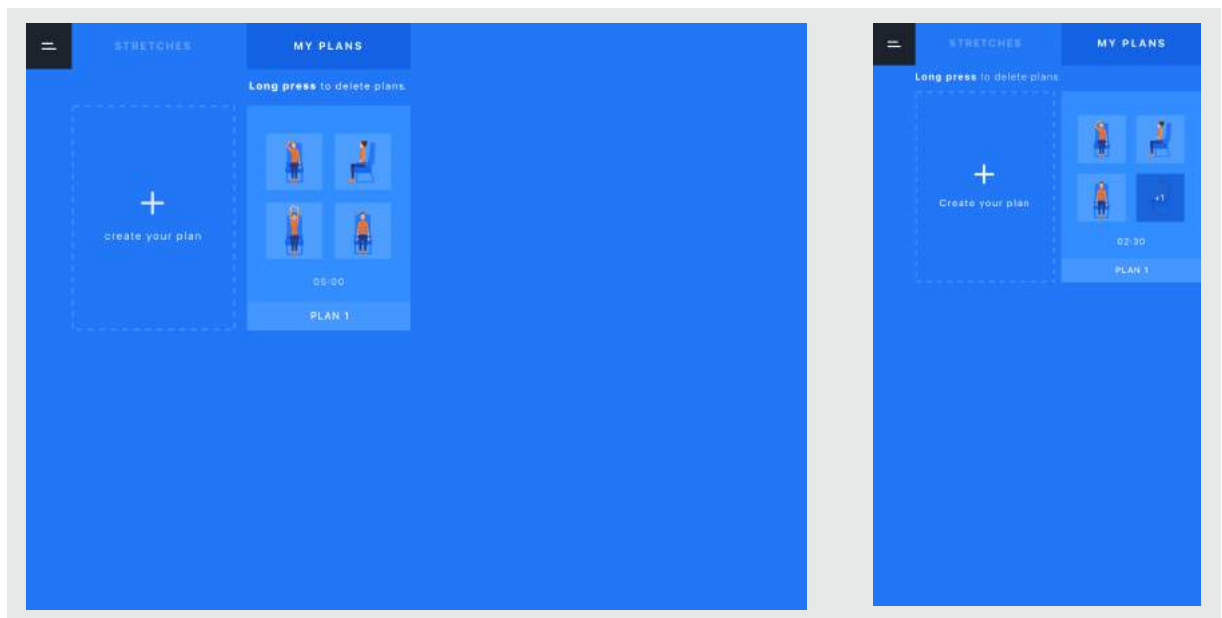
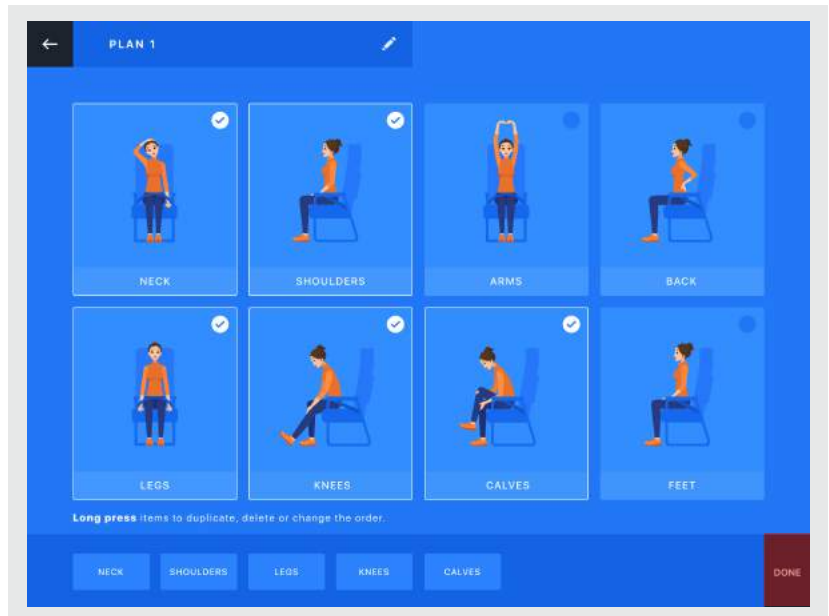


Figure 23.9.

The system would automatically switch to the “MY PLANS” section after users complete the creating process

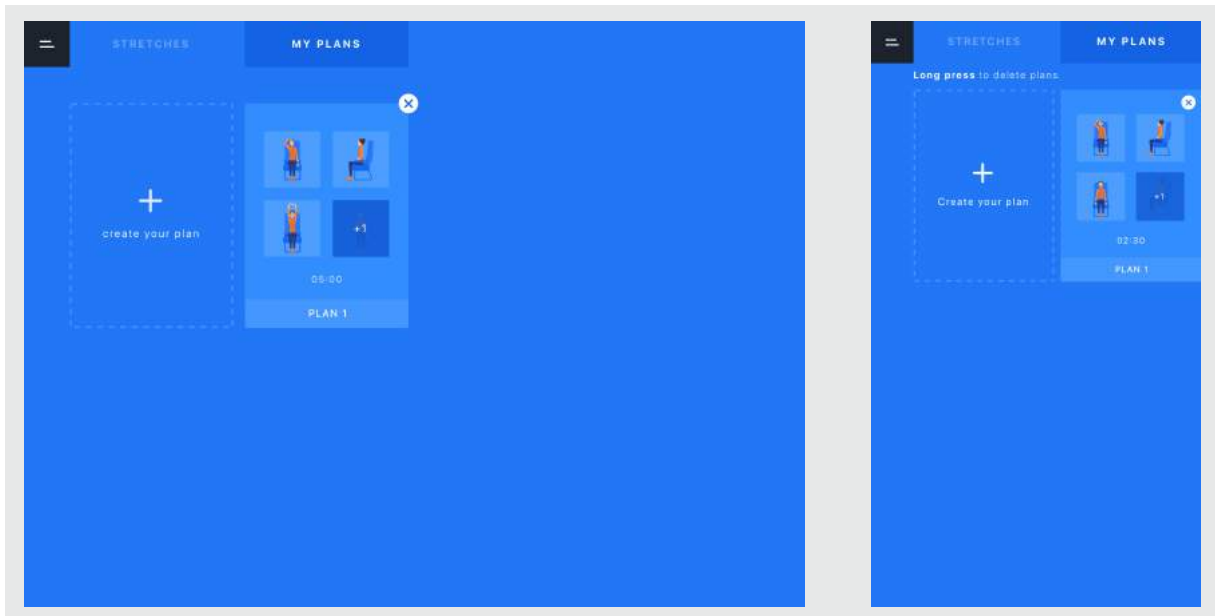


Figure 23.10.

Users can also long press to delete the stretching plan on this page

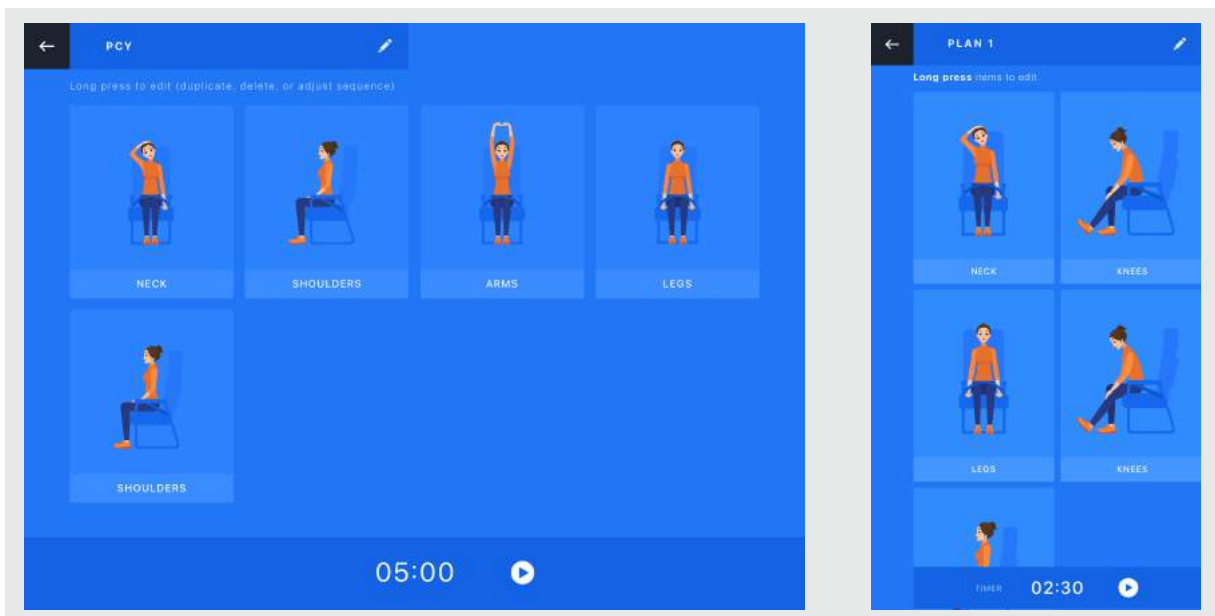


Figure 23.11.

App interface after entering one stretching plan

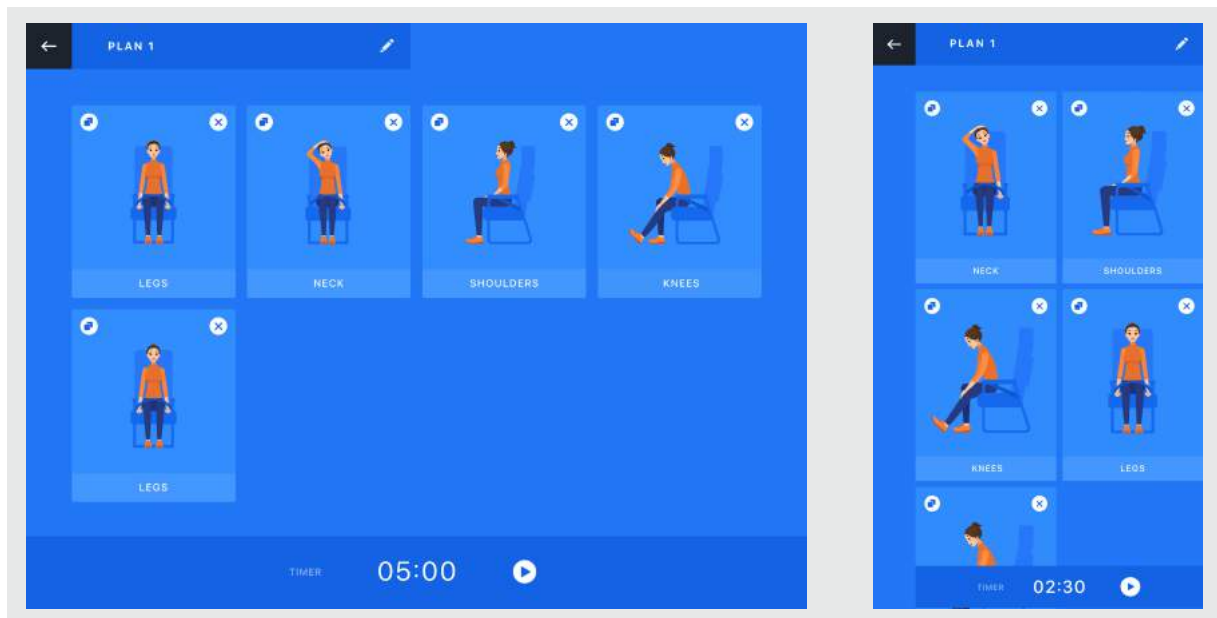


Figure 23.12.

After entering one stretching plan, users can also long press the stretches to duplicate and delete items

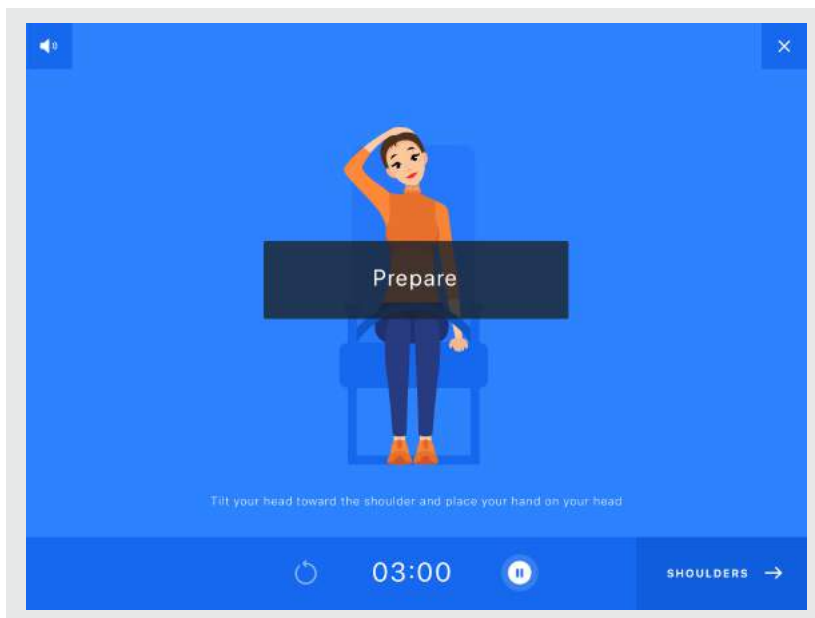
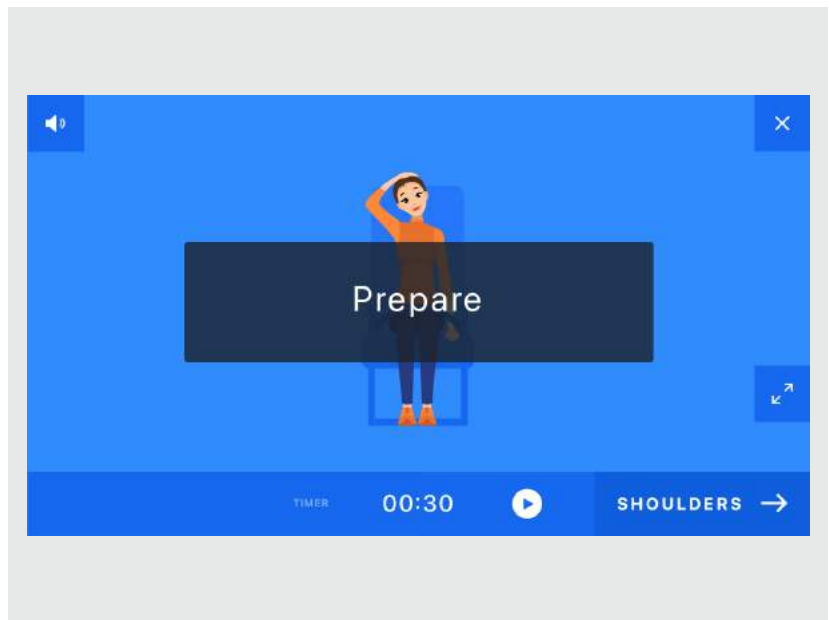


Figure 23.13.

If users click the “Play” button, they can watch and follow the stretching video from the beginning to end (iPad)

Figure 23.14.

This is how it looks, when users watch the stretching plan video on iPhone



Menu

There are two sections included in the “Menu” page, About and Settings. In “About” section, users can know more details about FlightFit and the app also provides many healthy tips for users to help them get a better inflight experience. In “Settings” section, users can turn on/off the notification and vibration to help them do stretches regularly during the flight.

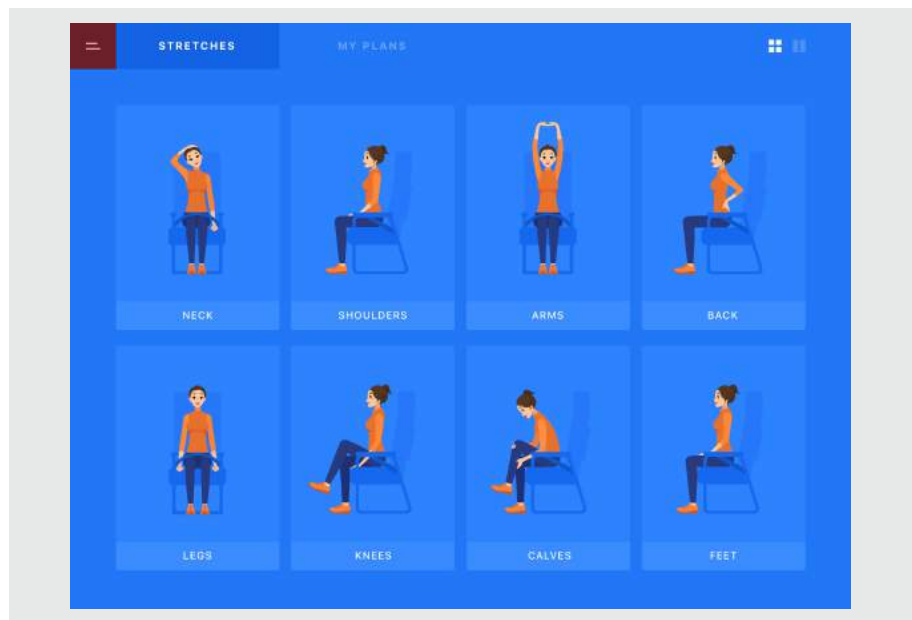


Figure 24.1.

Users can click the “Menu” icon on the top left to go to the “About” section (marked in red)

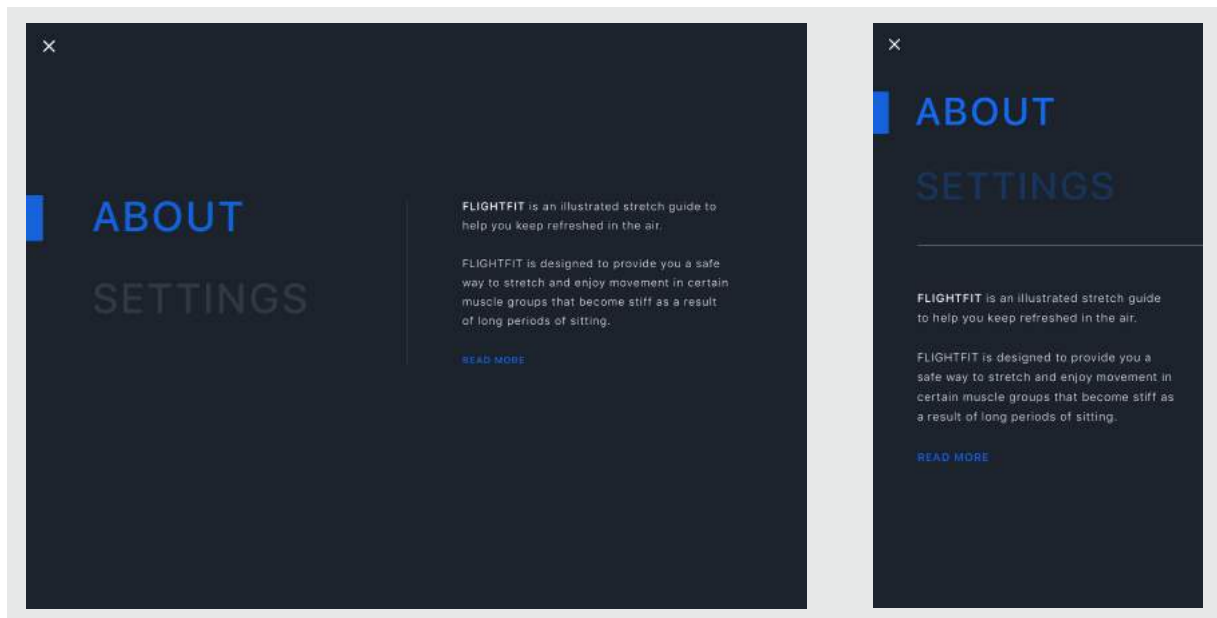


Figure 24.2.

About page: Users can click “READ MORE” to read more details

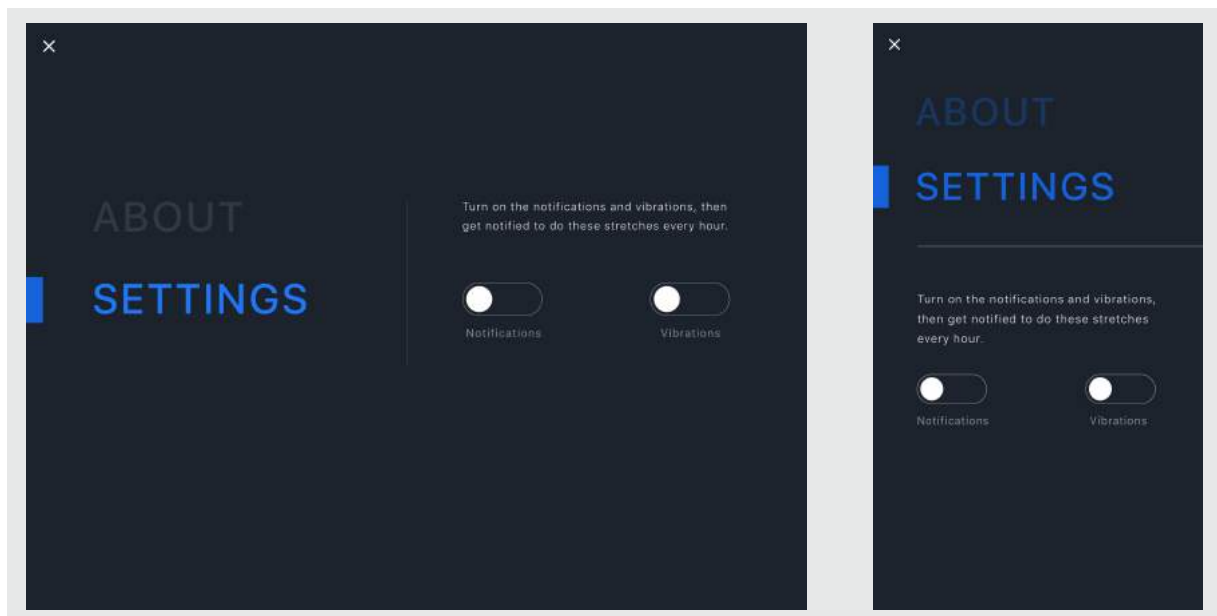


Figure 24.3.

Settings page: Users can turn on the “Notifications” and “Vibrations” of the reminder system (inactive state of the toggle button)

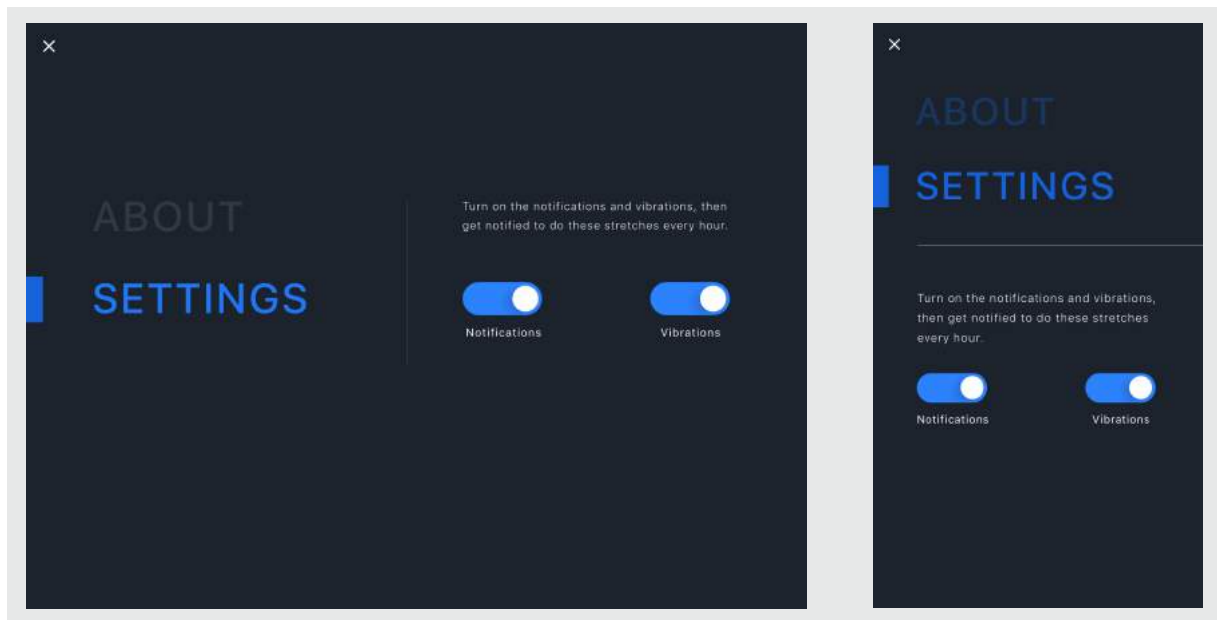


Figure 24.4.

Settings page: Active state of the toggle button

4.6.5 Interactive Prototype

An interactive prototype not only helps designers get users' feedbacks easily, but also adds an engaging feeling of the live and dynamic design process. When considering motion elements in UI, the designer should deeply think about how to increase usability, utility and desirability of the product before making a decision to apply it in the layout or transitions. An interactive prototype requires a thoughtful approach and needs to have a clear purpose set behind. A good interactive prototype is also an effective way to make the application simple, clear, bright and user-centered. The interactive and motion prototype of this thesis project was crafted and developed in Principle, it is an simple application which aims at creating animated UI design. The most incredible part is that Principle provides designers a solution to work seamlessly with Sketch.

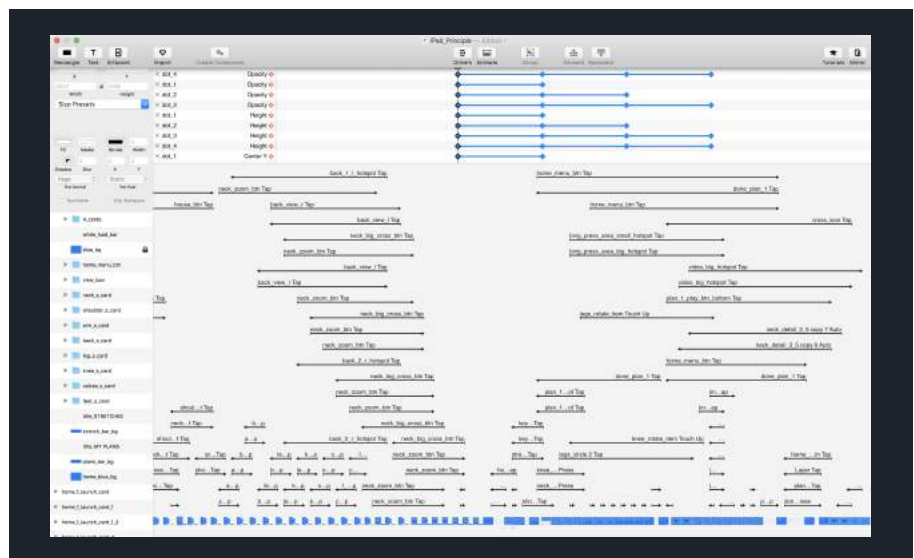


Figure 25.1.

Principle working files of the iPad prototype

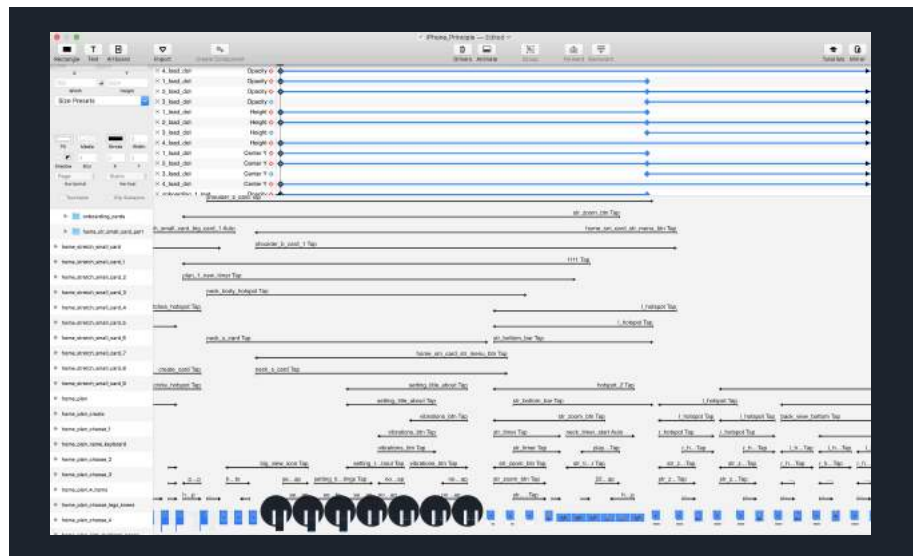


Figure 25.2.
Principle working files of
the iPhone prototype

Motion Prototype

Motion helps express the application's conversational tone. The final deliverables of the thesis project are an interactive prototype and a motion prototype for iPhone and iPad.

Figure 26.1.
Video screenshot of the
iPad motion prototype

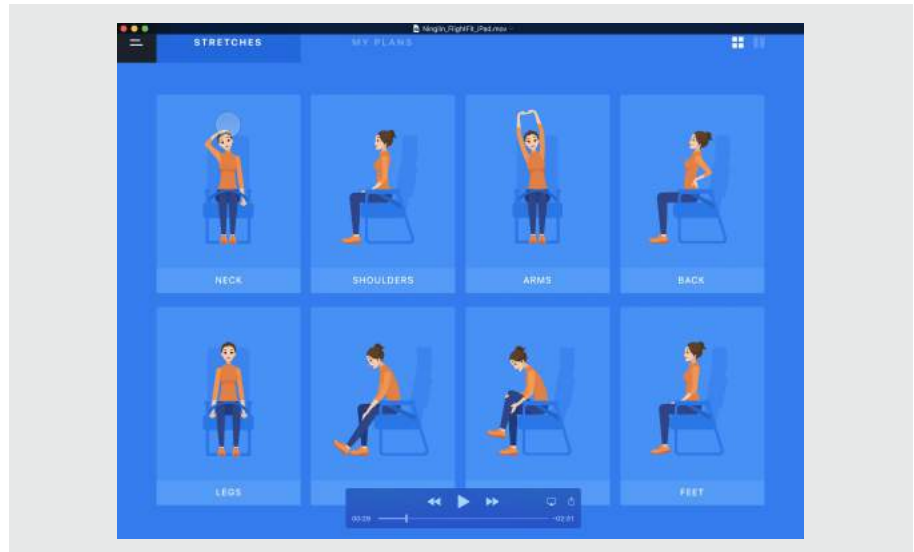
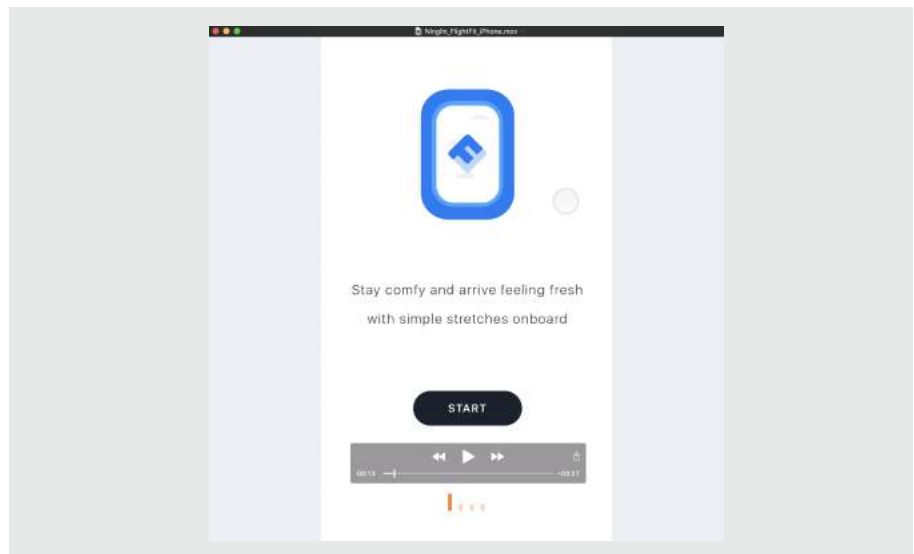


Figure 26.2.
Video screenshot of the
iPhone motion prototype



5

Evaluation

Usability Testing

A beautiful UI design can't guarantee success without a clean functional system. Usability testing is a technique which helps designers evaluate a product by testing it with its target audience. Through this, designers can find out possible problems in the product. And also, usability testing is a good way to get deeper insights from users' needs and preferences by observing their behaviors when they use the product. Based on the information collected from this stage, designers can analyse, create and improve the product more effective and user-centered. Thanks to the RIT community, the designer got many feedbacks and comments about the thesis project from the professors, peers, and students from other majors (Imagine RIT).

Three usability testing methods were used to test the application. Each method plays its important role for the final application:

- **Questionnaire**

Present interactive and motion prototype to target users, watch their reactions, and asked them to fill out the questionnaires. It helps designers to evaluate the effectiveness of the application and determine the level of users' satisfaction with the application.

- **Online Survey (Google Forms)**

Ask target users to perform specific tasks of the interactive prototype online by using the video sharing software (like GoogleHangout) to watch their reactions and fill out the online survey after the interview session.

• UsabilityHub

Designers can set up some particular user tasks on the platform, then all of the information including users' clicks and comments would be gathered automatically. Two testing sections were used a lot of the testing process, Preference Test and Navigation Test.

Thesis Project Survey

FlightFit: An application enabling air travelers to do stretches onboard

Ninglin Jiang

1. Overall design of the app

Terrible

Excellent

012345678910

2. Character illustrations

Terrible

Excellent

012345678910

3. I can understand the stretching techniques easily and clearly

Terrible

Excellent

012345678910

4. UI motions of the app

Terrible

Excellent

012345678910

5. I would recommend this app to others

Strongly Disagree

Strongly Agree

012345678910

Figure 27.
Sample of questionnaire

5 Evaluation

Figure 28.
Sample of Google Forms

5 Evaluation

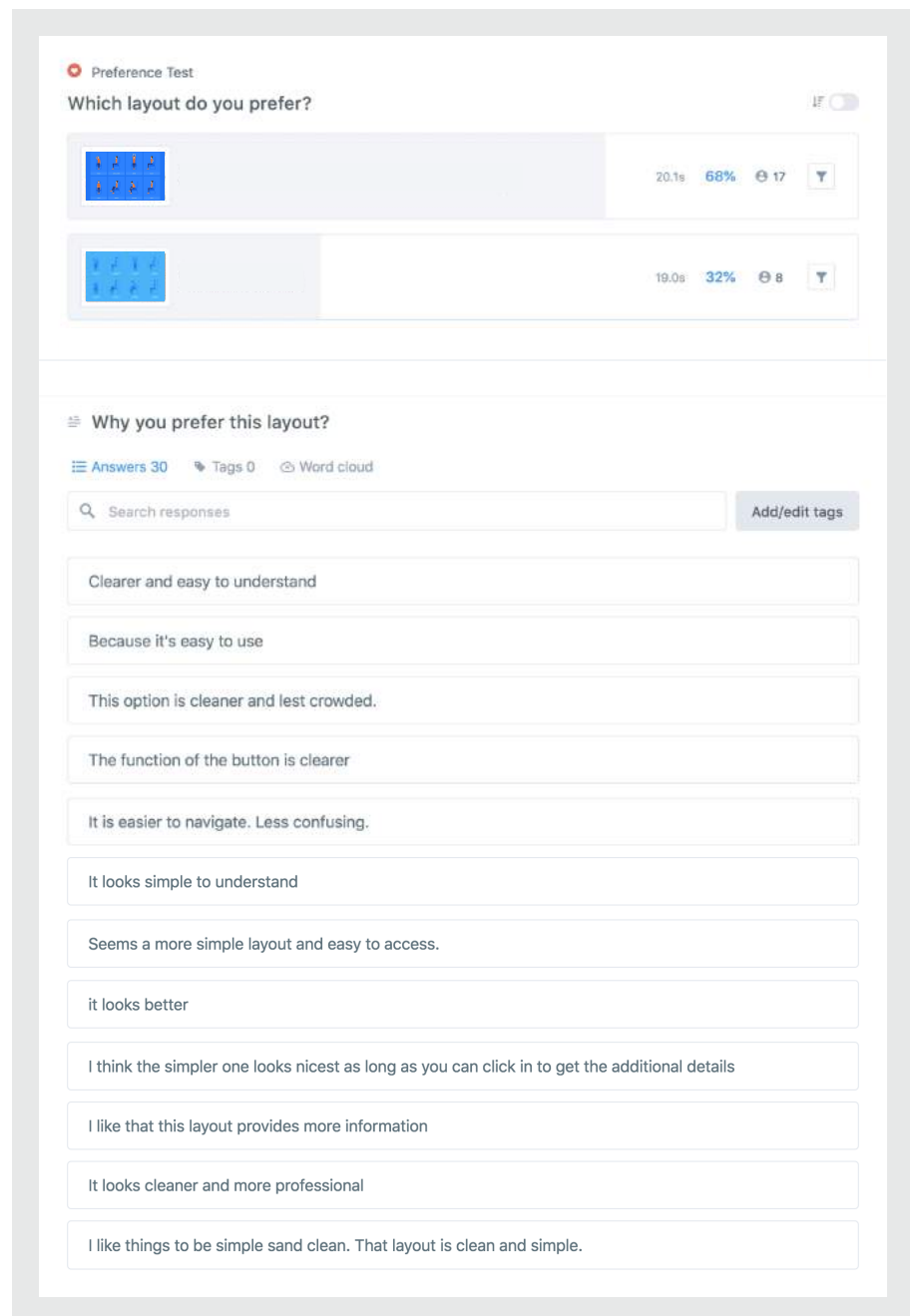


Figure 29.1.
Sample of preference test
on UsabilityHub

5 Evaluation

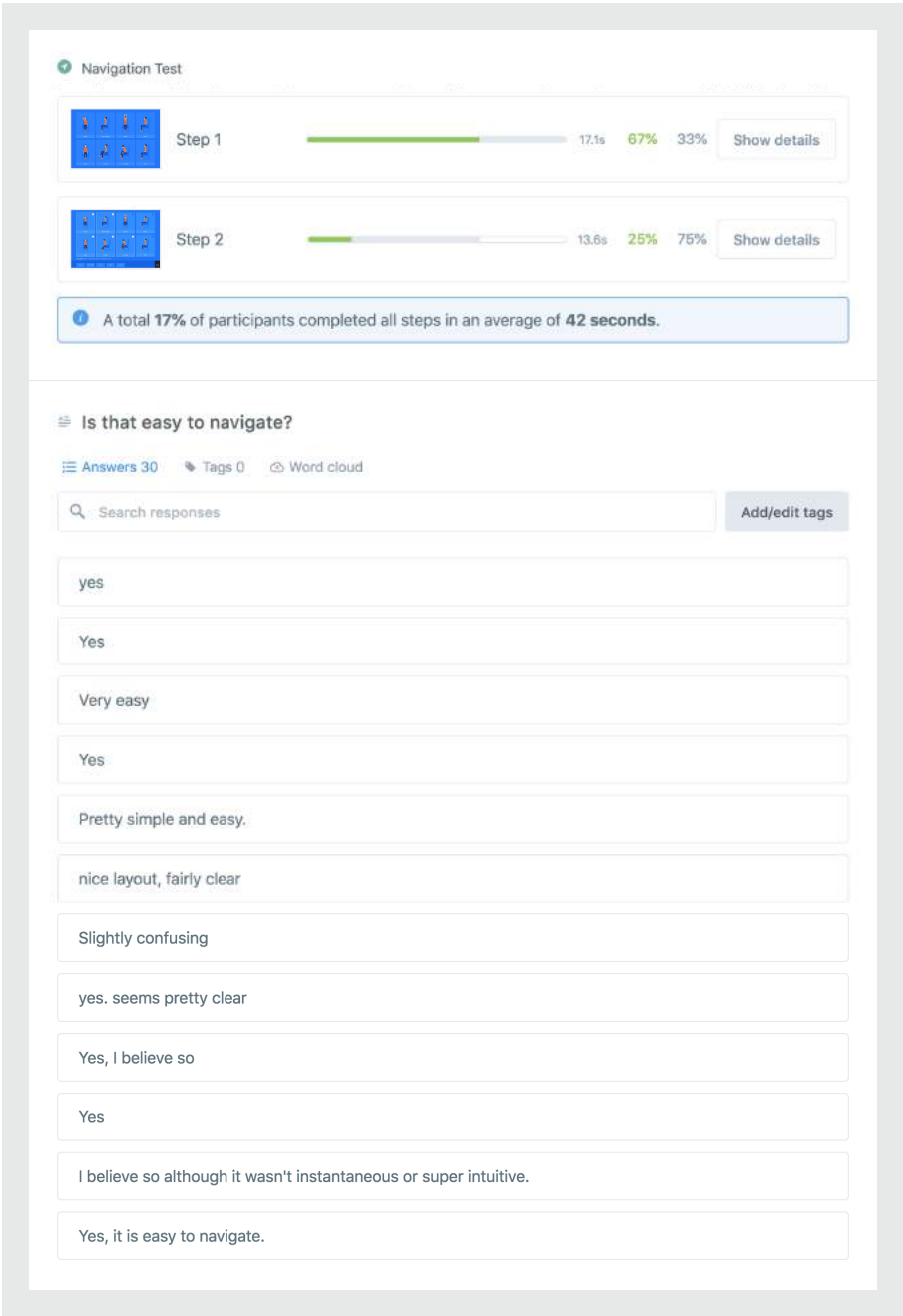


Figure 29.2.
Sample of navigation test
on UsabilityHub

Testing Results

Overall, the testing results were extremely positive. 65 participants were invited to test the final application (Interactive and Motion prototype). The testing showed that the visual design of the app was appealing, and it also conveyed a strong sense of inflight experience. And also, most of participants mentioned that the application was very interactive. The well-crafted UI motions enhanced the user experience, which made the application more user-friendly and intuitive. However, based on the testing results, some users found that they had difficulties when performing the “Create stretching plans” task, where they felt a little bit lost and didn’t know how to go to the next step. In order to help users better understand “MY PLANS” section and interact with the app more effectively, the designer added some notifications and tips during the creating process, which ensured the application runs smoothly.

6

Conclusion

6 Conclusion

In conclusion, it was a learning experience for the designer to complete the thesis project from the ground up. One of the best things about the learning and creation process is that the designer learned how to do things faster, better, and more efficiently. The designer learned how to conduct and analyze user research, create flowcharts and wireframes, craft animations through Principle, etc. Moreover, it was also a perfect opportunity to push the designer to think creatively. Going through the whole design process, the designer learned that not everything is perfect and the learning process is continuous. The more iterations explored created a better product in the end. Although this thesis project is conceptual, the designer believes it would help more people to raise awareness of blood clotting and encourage them to do inflight stretches regularly during the flights. In the future, the application can be widely applied into people's daily life, especially into the working environments by adding more seated-working stretches to improve people's health easily.

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Coppedge, Nathan. Perpetual Motion Genius' Guide to Interface Design: Interface Design Secrets. Paperback. 1st Edition. CreateSpace Independent Publishing Platform, September 22, 2014.

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Appendix: Thesis Proposal

Flight Fit!

An interactive infographic about stretching techniques for air travelers

Ninglin Jiang

Thesis Proposal for the Master of Fine Arts Degree

Rochester Institute of Technology
College of Imaging Arts and Sciences
School of Design
MFA Visual Communication Design
February, 2017

Thesis Committee Approval

Chief Thesis Adviser

Nancy Ciolek, Associate Professor, Visual Communication Design

Signature of Chief Thesis Adviser

Date

Associate Thesis Adviser

Chris Jackson, Professor, Visual Communication Design

Signature of Associate Thesis Adviser

Date

Associate Thesis Adviser

Daniel Deluna, Associate Professor, Visual Communication Design

Signature of Associate Thesis Adviser

Date

MFA Thesis Candidate Ninglin Jiang

Signature of MFA Thesis Candidate

vvDate

Abstract

Spending extended periods of time sitting on a plane can affect blood circulation, create tense muscles, and even lead to blood clots. About one in 4,500 travelers develop a dangerous blood clot in the legs during long-haul flights each year.¹ The World Health Organization recommends that travelers stand up as much as possible during flights because the risk of a blood clot doubles if people remain seated for more than four hours. But it isn't easy to get up and walk around on an airplane.

However, some basic stretching techniques travelers can do while seated can help them reach their destination with reduced stiffness, soreness and fatigue.

"Flight Fit" is an interactive infographic design that introduces basic stretching techniques to travelers on the airplane. This thesis project concept not only helps travelers keep their body active, but also raises awareness of preventing blood clotting and extensive sitting.

The thesis project includes two parts:

- A motion prototype showing interactions and transitions of the product
- An responsive infographic for tablets and smartphones

The responsive infographic provides air travelers step-by-step gifs, audios, and stretches that are practical and easy-to-learn while sitting in seats during long flights.

By creating a graphical, interactive, and educational infographic design, travelers can minimize the risk of blood clotting and mitigate against achy muscles during long flights.

Abstract

Keywords

exercise, stretch, airplane, flight, interaction design, motion graphic, infographic design

Blog address

ninglinthesis.tumblr.com

¹ Kos, Cynthia A. "Air Travel and Deep Vein Thrombosis DVT - Blood Clots." Blood Clots. Accessed February 10, 2016. https://www.stoptheclot.org/learn_more/air_travel_and_thrombosis.html.

Situation Analysis

Sitting for a long airplane ride restricts blood flow throughout the legs, which puts travelers at a greater risk for pooling and clotting blood. Tight, cramped airplane seats and a considerable lack of movement throughout the flight both can be contributing factors to blood clotting. And also, the flight environment can be low in humidity by the dry air and reduced oxygen are other contributing factors. Therefore, travelers need to raise awareness and learn some basic stretches to keep body refreshed.

But now travelers on airplane are facing some difficulties in learning stretch techniques. First of all, some travelers are in a hurry to get to the airport, also they don't have extra time to research and download the offline stretch instructions in advance. In addition, most airlines are offering expensive in-flight wi-fi network, even though travelers want to get information about stretch techniques. So travelers may not be access to get what they want. What's more, some infographics travelers can find on internet or articles are unclear and impractical. Some infographics are just showing texts or rough drawings of body parts, people can't understand the movements very clearly and correctly. Also, some infographics provide photographs and videos to explain the instructions impractical, because some of the exercises can only be performed in the aisle or showing big movements that travelers would disturb their neighbors. The exercises are not considering dimensions of the tight space on airplanes.

Therefore, an interactive infographic design that travelers can access by using their own devices on airplane would be better for their inflight experiences.

Problem Statement

Providing basic stretch techniques in an interactive and educational way to help and prevent travelers from soreness and blood clotting is the main focus of this thesis.

The thesis aims to answer the following questions:

- Is there an interactive solution that allows travelers to learn and access stretch techniques on airplane easily and friendly?
- How can an interactive infographic encourage and guide travelers to do basic stretches to reduce stiff and sore?
- How can a design system raise awareness of health in-flight, which prevents travelers from prolonged immobility and blood clotting?

"Flight Fit" is an interactive infographic design that introduces basic stretching skills to travelers on the airplane. The design system focuses on interaction, information and motion graphic design. It includes two parts: a motion prototype, and an responsive infographic for iOS devices.

By combining all of these components, it encourages travelers to be aware of the health impacts from the extensive sitting, and learn some basic stretches to keep body active. And the integration of information and motion graphic design will be used to design the thesis project.

Survey of Literature

Exercise & Workout

Books

The Airplane Workout: Don't Just Sit There!

Gold, Diane. The Airplane Workout: Don't Just Sit There! Kung Fu Conservatory, 2014.

This book is simple, detailed, has photos to give air travelers an easier way to learn and can be adjusted for all fitness levels. Aside from helping with anxiety, relaxation and boredom, the exercises, based upon ancient kung fu, call for good body alignment, included in the instructions. Know that the detailed description is so that the body is aligned throughout the program.

Travel Doesn't Have to Make You Sick: Staying Healthy in Airports, Airplanes, and Anywhere On the Road

Braly, Ken. Travel Doesn't Have to Make You Sick: Staying Healthy in Airports, Airplanes, and Anywhere On the Road. SpeakerNet News, 2011.

This eBook is full of ideas on how air travelers can stay healthy while on the airplane.

Articles

Inflight exercise

"Inflight Exercise." Inflight Exercise. Accessed February 22, 2016. <http://www.virgin-atlantic.com/us/en/travel-information/your-health/in-flight-exercise.html>.

Stay comfy and arrive feeling fresh with these simple ways to stay limbered up onboard.

Survey of Literature

How to Do an In Flight Fitness Workout

"How to Do an In Flight Fitness Workout." WikiHow. Accessed February 22, 2016. <http://www.wikihow.com/Do-an-In-Flight-Fitness-Workout>.

The easy-to-follow routine outlined in this article will keep body supple and refreshed.

Your Health Inflight

"Your Health Inflight." Inflight Health and Wellness. Accessed February 22, 2016. <http://www.qantas.com/travel/airlines/your-health-inflight/global/en>.

These exercises are designed to provide a safe way to stretch and enjoy movement in certain muscle groups that can become stiff as a result of long periods of sitting. They may be effective at increasing the body's blood circulation and massaging the muscles.

JAL - For a Pleasant Flight

"JAL - For a Pleasant Flight." JAL - For a Pleasant Flight. Accessed February 22, 2016. <https://www.jal.co.jp/en/health/flying>.

To prevent vein thrombosis in the legs, air travelers can move and stretch legs step-by-step at regular intervals from this article.

Videos

Exercises to Do on the Airplane

Potts, Rolf. "Exercises to Do on the Airplane." USA TODAY. Accessed February 22, 2016. <http://traveltips.usatoday.com/exercises-airplane-10614.html>.

Learn how to exercise the ankles, legs, neck and shoulders with help from a travel author in this video on exercises to do on an airplane.

Survey of Literature

Airplane Stretches Travel Workout

"Sit and Be Fit - Airplane Workout to Prevent DVT - Mary Ann Wilson, RN."
YouTube. April 29, 2011. Accessed February 22, 2016.
<https://www.youtube.com/watch?v=tL4D5tlzljc>.

Air travelers can ward off the body aches and creaky joints that often accompany flying. Here are four simple moves to keep your body feeling its best while people jet around for the holidays.

Travel tips: the amazing 7-exercise travel workout that you can do from your airplane seat!

"Travel Tips: The Amazing 7-exercise Travel Workout That You Can Do from Your Airplane Seat!" YouTube. October 10, 2011. Accessed February 22, 2016. <https://www.youtube.com/watch?v=eCxDeIdIWpU>.

In this video, here is one more way to have fun in the airplane: Work out! By working out air travelers will avoid becoming super-stiff because of a long flight, and will fight airplane boredom!

Sit and Be Fit

"Sit and Be Fit - Airplane Workout to Prevent DVT - Mary Ann Wilson, RN."
YouTube. April 29, 2011. Accessed February 22, 2016.
<https://www.youtube.com/watch?v=tL4D5tlzljc>.

This is a segment from the award-winning DVT (Deep Vein Thrombosis) workout. It is quick and can be done in the most confined spaces. This three-minute workout is perfect at desk, sitting on an airplane or anywhere people's motion is confined.

Survey of Literature

Infographic Design

Books

Cool Infographics: Effective Communication with Data Visualization and Design

Krum, Randy. *Cool Infographics: Effective Communication with Data Visualization and Design*. 1st ed. Wiley, 2013.

This innovative book presents the design process and the best software tools for creating infographics that communicate. Including a special section on how to construct the increasingly popular infographic resume, the book offers graphic designers, marketers, and business professionals vital information on the most effective ways to present data.

Infographics Designers' Sketchbooks

Heller, Steven, and Rick Landers. *Infographic Designers' Sketchbooks*. Princeton Architectural Press, 2014.

In *Infographic Designers' Sketchbooks*, more than fifty of the world's leading graphic designers and illustrators open up their private sketchbooks to offer a rare glimpse of their creative processes. Emphasizing idea-generating methods—from doodles and drawings to three-dimensional and digital mock-ups.

The Wall Street Journal Guide to Information Graphics: The Dos and Don'ts of Presenting Data, Facts, and Figures

Wong, Dona M. *The Wall Street Journal Guide to Information Graphics: The Dos and Don'ts of Presenting Data, Facts, and Figures*. New York: W.W. Norton &, 2013.

The book is organized in a series of mini-workshops backed up with illustrated examples. This is an invaluable reference work for students and professional in all fields.

Survey of Literature

Interaction Design

Books

The Fundamentals of Interactive Design

Salmond, Michael, and Gavin Ambrose. *The Fundamentals of Interactive Design*. London: AVA Academia, 2013.

This book provides a core skill-set and an invaluable insight into the world of interactive design. It examines the work flow and process of creating and exporting design across multiple media platforms in a progressive and logical way. The book is aimed at designers who have never worked within the interactive medium as well as those who have some digital knowledge but are looking for application across a wider spectrum of media.

The Principles and Processes of Interactive Design

Steane, Jamie. *The Principles and Processes of Interactive Design*. Fairchild Books, 2014.

The book is aimed at new designers from across the design and media disciplines who want to learn the fundamentals of designing for interactive media. This book is intended both as a primer and companion guide on how to research, plan and design for increasingly prevalent interactive projects.

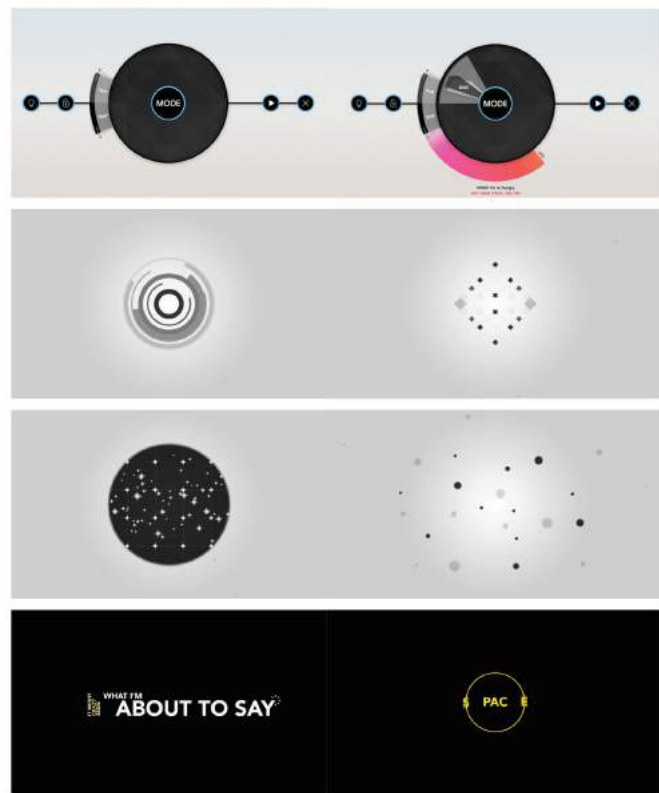
About Face: The Essentials of Interaction Design

Cooper, Alan, and Robert Reimann. *About Face: The Essentials of Interaction Design*. Fourth ed. Wiley Pub. 2014.

This comprehensive guide takes the worldwide shift to smartphones and tablets into account. *About Face* is the book that brought interaction design out of the research labs and into the everyday lexicon.

Design Ideation

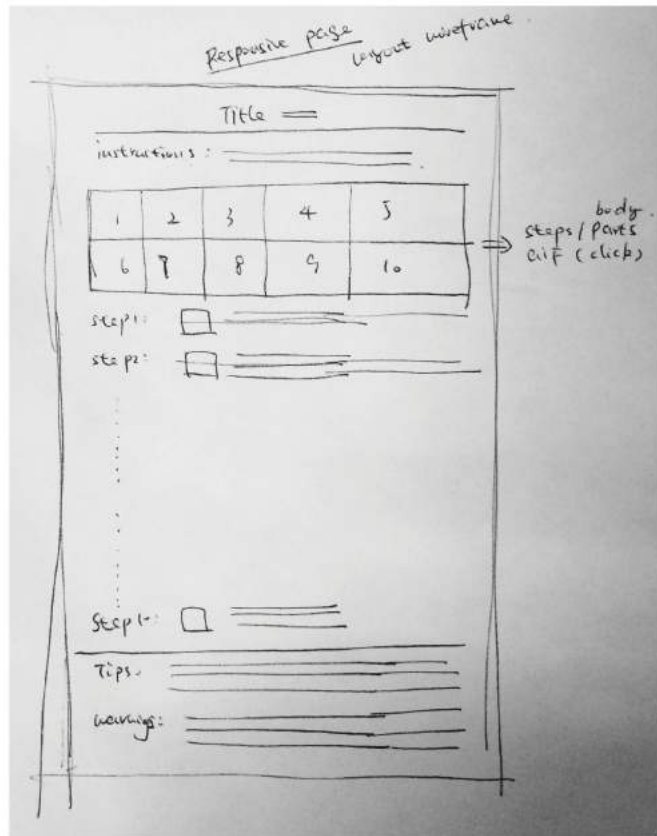
Personal Style



Design Ideation

Responsive Infographic (for tablets and smartphones)

Sketch

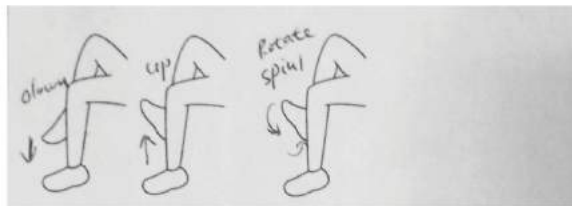


Design Ideation

Stretch Contents

Sketch

Ankles



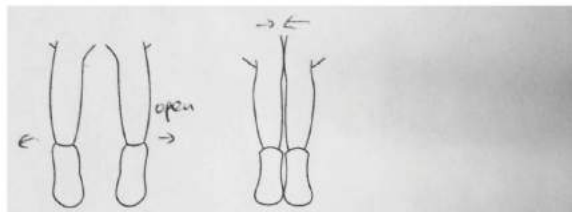
Toes



Heels



Legs

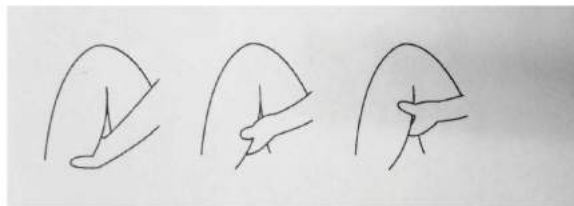


Design Ideation

Stretch Contents

Sketch

Calves



Neck



Methodology

Objective

"Flight Fit" is an interactive infographic design that introduces basic stretching skills to travelers on airplane. The thesis project not only helps travelers to keep body active but also raises awareness of preventing blood clotting.

The design system focuses on interaction, information and motion graphic design. It includes two parts: a motion prototype, and an responsive infographic for tablets and smartphones.

Process

- Research on the existing interactive infographic design
- User modeling and persona creation for target audience
- Use Latch and mind-mapping to brainstorming and ideation
- Sketch and create flowchart and storyboard
- Design a simple wireframe of the interface
- Draw illustrations and design a prototype
- Import files to production
- Test and revise the thesis project after feedbacks
- Present the thesis project and attend thesis show

Methodology

Approach

The thesis project started by user investigation and further user testing was conducted throughout the processes, which includes the initial brainstorming and sketching, test mockups, storyboards and production in Adobe software.

Target Audience

- Travelers who are taking long haul flight
(more than 4 hours, especially for the international flight)
- Age range from 14 to 60 years old
- Travelers who should be in good health and free from high blood pressure, heart, back or neck problems, motion sickness, or other conditions
- Travelers who have the general mobility

Implementation Strategies

This thesis requires a background knowledge and degree of understanding of the field of graphic, user interface and user experience design skills. The scope of the thesis is to achieve an interaction integration.

Software



Hardware

Apple iMac desktop computer & Apple iPhone & Apple iPad

Dissemination

To promote the thesis project, the designer will upload the responsive infographics to the thesis website as well as designer's personal website. And also, the motion prototype will be uploaded to video sharing web sites, such as YouTube and Vimeo. The proposal will also be submitted to major design competitions such as:

- RIT Thesis Show
- Imagine RIT
- Personal Web Site
- Communication Arts Interactive Competition
- Adobe Design Achievement Awards
- HOW Interactive Design Awards
- American Design Award: Student Annual Design Contest

Evaluation Plan

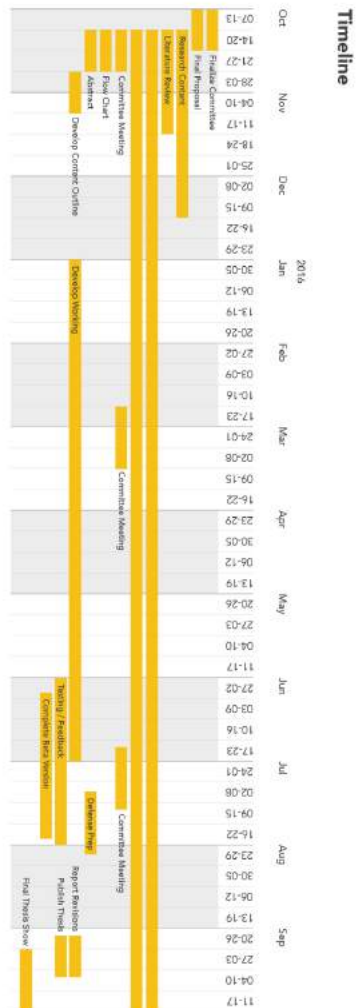
Considerations

- Do users understand the idea of the infographic and how it works?
- What is the user's impression of the motion graphic (look/feel)?
- Is this infographic helpful to raise awareness about blood-clotting?
- Does the thesis project achieve its goal?

How

- Face-to-Face observation of user-interaction
- Online survey

Timeline



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